The Eye and the Ideas
Descartes on the Nature of Bodies

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von

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εἰ γὰρ ἦν ὁ ὀφθαλμὸς ζῷον, ψυχὴ ἂν ἦν αὐτοῦ ἡ ὄψις
["If the eye were a living being, its soul would be its vision"]

De anima, 412^{b}19-20

A cause que c'est l'âme qui voit, et non pas l'œil
["Since it is the soul that sees, not the eye"]

Dioptrique, AT VI 141 7-8

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Introduction

Opening our eyes, we are confronted at any time with objects with a color and a shape. But is the world as we perceive it to be? Are bodies as such truly colored, and truly shaped, and with all of the manifold properties that we happen to ascribe to them in light of our sense-perceptions? Or is there a way other than sense-perception – some other power of the mind, for example – for us to grasp the essence of material objects? Can we figure out for sure whether these bodies are there at all or are just a product of the mind? Or should we resign ourselves to ignorance and skepticism?

After Ancient philosophers first raised these questions, many answers have been offered throughout the centuries, and many others will be in the future: the significance of the problems just mentioned runs in fact so deep that its solution depends and have bearings on the entire philosophical system of any thinker struggling to make sense thereof. If these problems were Ancients and are still alive, it was nonetheless in the Early Modern Age that they were asked with the utmost urgency and came to the fore of the philosophical debate. Some of the reasons for this are well-known: the new wake of Skepticism, especially after the 1562 translation of Sextus Empiricus' *Outlines*; the related questioning of received Aristotelian philosophy, according to which it was only through the senses that we come to know of material objects; the demand for a firm foundation of the new science, which had as its prime object of enquire precisely these bodies and their properties; the purely intellectual curiosity and joy of figuring out whether the world is indeed how it looks like, after so many discoveries and historical events of those years had started to challenge the age-long understanding of man's position in the universe. Some of these new-made discoveries pertained moreover precisely to the domain of sense-perception and, more specifically, to what had traditionally been taken to be the most problematic of all senses: vision. The most important figures in this regard were arguably Vesalius and Kepler, although many other scientists and philosophers would have to be mentioned, from a period so rich in ingenious and skillful thinkers to be deservedly known as "the age of genius".

In the grounding text of modern anatomy – the *De humani corporis fabrica*, published in 1543 – Andreas Vesalius had indeed disproven the Galenic and Medieval physiology of vision, which had been construed in order to make possible for the object's color to "glowingly travel along the path of the spirits" through the hollow optic nerves to the brain and claimed that it was precisely by virtue of this "illumination and coloring" of the sense organs relevant to the visual

process – first the eyes, thence the brain – that the perceiver became acquainted with the true color of the object.[1] As for Kepler, his findings in optics are second only to his universally acclaimed achievements in astronomy: his 1604 *Ad Vitellionem Paralipomena* – whose subtitle tellingly reads *Astronomiæ Pars Optica* – marks the foundation of modern optics. Kepler's discovery that vision does not occur by virtue of a coloring of the crystalline lens but because of an inverted and reversed luminous image focused by the eye's refracting surfaces – the crystalline lens included – onto the retina disproved in fact the entire theory of the Perspectivists (i.e. of the Medieval writers in the field). The Perspectivists had in fact always insisted that, if we are to perceive the object in its actual orientation, the corresponding sense-impression must be orientated accordingly. The received theory that vision (like all senses) is to be explained by reference to a so-called *species* or *similitudo* travelling from the object to the brain was thereby shaken to its foundations, if not outright exploded: the impression reaching the brain was indeed discovered to be neither properly arranged, nor of the same colors as the object, for the simple reason that no color could travel through opaque, non-hollow nerves. Vesalius and Kepler confessed that were puzzled by their own results, as we still are today: the problem of explaining how a nerve impulse could give rise to an altogether different color-sensation is not indeed much affected by whether the nerve impulse is conceived to be an electrical signal (as we do today) or in terms of a local motion. Virtually all previous accounts, on the other hand, bypassed the question by simply *postulating* that in the case of veridical sense-perception the physiological stimulus and the resulting sensation were somehow similar, thereby ruling out right from the beginning the existence of any gap between the two. Kepler, unable as he was to make sense of the problem despite having mused on it for some twenty years, wrote that "he left to the natural philosophers (*physicis*) to argue about" these issues, thereby bequeathing the problem to the thinkers of his time and to the ones to come.[2]

The importance of Kepler's theory of vision – or, maybe better, of the momentous problems it raised – for the philosophy of the 16th Century is difficult to overrate (and not only for philosophy, actually: Kepler's theory was indeed crucial also for the visual arts of the time,

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[1] The quotations come respectively from John Pecham, *De anima quæsitum est utrum recipiat in se species corporales ab extra* in Id., *Tractatus de Anima*, ed. Gaundentius Melani (Firenze: Bibliotheca di Studi Francescani 1948), 147: "radiose transit per vias spirituum". Witelo, *Opticæ thesaurus… Vitellionis thuringopoloni Opticæ libri decem* (Basel: Episcopios 1572), III 22, 95: "Sentiens itaque ultimum, quod est in nervo communi, comprehendit lucem ex illuminatione corporis huius & colorem ex eius coloratione, quoniam horum formæ transeunt & figuntur in ipso" (for a detailed analysis of the passages, see §21).

[2] Johannes Kepler, *Ad Vitellionem Paralipomena* (Frankfurt: Marnius 1604), 168-69; *Optics: Paralipomena to Witelo & Optical Part of Astronomy,* ed. William H. Donahue (Santa Fe: Green Lion Press 2000), 180*.

especially in the Netherlands).[3] In one of the very few admissions of an intellectual debt, the scientist who was to discover the law of refraction which Kepler had been frantically seeking for years celebrated him as his "first master in optics".[4] Descartes had indeed studied Kepler's works thoroughly, and he would have repeatedly come back to them in his researches, to the point that a Calvinist theologian had to complain that on Descartes' working desk there was no *Bible*, but only Kepler (together with Ovid's *Metamorphoses*).[5] Descartes was however as much concerned with geometrical and physical optics as with the philosophy of vision and, more in general, perception, so that he felt compelled "to argue about" Kepler's difficulty. In so doing, Descartes made arguably the first systematic attempt to deal with the issue by following it up to its most far-reaching implications, rather than forcibly adapt it to an already existing scheme (the way some other leading figures of the time such as Scheiner and Gassendi did, and also, in a sense, a late Scholastic like Rubio, on whose texts Descartes was trained in La Flèche).

In this work, I show that the theory of perception – and, first off, of vision – played indeed an essential role in Descartes' theory on the nature of bodies. All of the strands mentioned above concurred to make of it a decisive issue for Descartes: the skepticism that he was to present in the *First Meditation* as the only pathway to science; the foundation of this very science, which was intended by Descartes to "destroy the principles of Aristotle",[6] who had argued for an origin in sensation of all human notions; a deeply renovated understanding of what it is to be a perceiver and, more generally, a cognizer, once Descartes has argued that all philosophical enquires had to start from the thinking I. In light of this philosophical framework, Descartes realized that Vesalius's and Kepler's discoveries had to do with way more than the mere anatomy of the optical nerves and of the eye. If one looked at them under the proper light, Descartes thought that these Early Modern findings spoke in fact forcefully and in all respects against the received theory of perception, on which late Aristotelians had grounded their metaphysics of bodies pursuant to their dictum *nihil est in intellectu quod prius non fuerit in sensu*. Physiological optics, in Descartes' hands, turned thereby from being a minor discipline to his major argument in favor of his metaphysics of bodies: more than being concerned with the proper functioning of the eyes, Descartes' account of the visual process ushered in a fresh, radically diverse image of

[3] See Svetlana Alpers, *The Art of Describing: Dutch Art in the Seventeenth Century* (Chicago - London: University of Chicago Press 1983).

[4] To Mersenne, 31 March 1638; AT II 86: "Kepler a été mon 1er maître en optique, et que je crois qu'il a été celui de tous qui en a le plus su par ci-devant".

[5] Jacobus Revius, *Kartesiomania* (Leyden: H. de Vogel 1654), 307-308. Revius met with Descartes in Deventer, where Descartes resided approximately between May 1632 and February 1634.

[6] To Mersenne, 7 February 1641; AT III 298; K 173*.

the world. According to Descartes nothing but the theory of perception broadly construed could indeed establish that bodies are not colored, neither hot nor cold, with no smell and flavor.

Descartes took himself to have established by his 'first philosophy' – this being the declared subject matter of the *Meditations* – that bodies are extended and that they exist *in rerum natura* and not only in the mind. According to Descartes the *Meditations* do indeed "establish a distinct concept of corporeal nature", proving as they are that bodies are *res extensæ*.[7] That bodies are *nothing but* extended things – i.e. that they have no properties besides being extended in three-dimensions, with a certain shape and in motion or at rest in relation to each other – is on the other hand a much stronger conclusion. So strong a conclusion that Descartes believed that 'first philosophy' could not achieve it by its own, thus committing the demonstration of this grand claim to his 'natural philosophy' and, more specifically, to his account of perception. Once integrated into the overall mechanistic account of physical phenomena he was advancing, Descartes thought that Vesalius's and Kepler's finding left in fact no other option but to deny all properties other than the geometrical ones to material substances. Or, at least, so I argue in this work: in my interpretation, contrary to what is normally assumed, that bodies are nothing but extended things is not indeed the starting point of Descartes' physics, but its crowning achievement.

The point of this work is not however to advocate some sort of radical empirical foundation of Descartes' metaphysics of bodies, as explicitly argued for example by Desmond Clarke.[8] The point is rather to correct what is, as a matter of fact, the prevailing line of interpretation in the studies in the field, according to which Descartes believed he had demonstrated that bodies are nothing but extended substances thanks to his *first* philosophy alone. This thesis, is claimed, would indeed represent one of the conclusive results of the 1641 *Meditations* and, accordingly, of the first book of the 1644 *Principles* (presented by Descartes himself as an *abrégé* of his earlier work).[9] Although differently spelled out, the gist of this interpretation has been endorsed by scholars as different in approach as Gilson and Simmons, or as Garber and Gueroult. Already the first Cartesians seem actually to have interpreted or at least rephrased Descartes' philosophy along these lines, which is indeed become a sort of *locus*

[7] *Meditationes*, *Synopsis*; AT VII 13, 13-15.

[8] Cf. Desmond M. Clarke, *Descartes' Philosophy of Science* (University Park, PA: Pennsylvania State University Press 1982). I discuss Clarke's interpretation in §27 (but see already §4).

[9] To Chanut, 26 February 1649; AT V 291: "sa première partie ne soit qu'un abrégé de ce que j'ai écrit en mes *Méditations*". The first part plus the first sections of the second (*Principia* II 1-4), to be fully accurate, where Descartes proves the existence of bodies, this being one of the main intended conclusion of the *Sixth Meditation*, whose title reads *De rerum materialium existentia, & reali mentis a corpore distinctione*.

classicus in the history of philosophy. Accordingly, thinkers as diverse as Husserl, Cassirer and Heidegger could take this (alleged) purely philosophical demonstration that the only properties of bodies are *geometrical* properties as their starting point in interpreting Descartes' philosophy, despite coming up with very different assessments of this claim according to their different theoretical convictions.

As pointed out again in very recent times, it is however "exceedingly difficult to determine where exactly the arguments are taking place" – the arguments, namely, by which Descartes intended to prove that bodies are nothing but extended substances.[10] I argue that the main reason why Descartes' arguments in favor of so crucial a thesis of his philosophical system has proven to be "nearly invisible" to most scholars, is because virtually all interpreters had been looking for it in the wrong places. Although setting the stage for most of the arguments to come, the *Meditations* are indeed far from offering the entire story. What Descartes maintained to have established in the *Meditations* is indeed only that material objects *could* turn out to be nothing but extended substances, leaving however to empirical researches to determine whether this is in fact the case or not.

The discovery of the intended logic of Descartes' theory of bodies calls moreover for a general reappraisal of Descartes' overall project and makes a case for what could be defined a "theoretical modesty" on Descartes' part. Descartes himself made clear this point in one of his first extant writings, were he claimed that the first question to be asked in philosophy does not only concern the *nature* of our cognition (*quid sit humana cognitio*) but also its *scope* – i.e. "the limits of its extension" (*quousque extendatur*).[11] The point should not of course be overstated: Descartes' remains one of the boldest philosophies of the time, and modesty was definitely not the chief virtue of our René. Still, the absolute self-confidence of the meditator that what he knows is true is not to be mistaken for the arrogance that what he does not know is *eo ipso* false. Descartes did not in fact admit any "rule of falsity" alongside his celebrated "rule of truth", according to which "whatever is perceived in a clear and distinct way is true": Descartes' philosophy appeals indeed to God only as the ultimate warrantor of our science, not as a handy excuser of our ignorance. According to Descartes, *ab obscuro ad falsum non valet consequentia*.

This point is easy to escape, since the thinker of the *Meditations* was confident to know a lot, but there also were quite a few and all-important issues concerning which he had to admit

[10] Lisa Downing, "Sensibles Qualities and Material Bodies in Descartes and Boyle" in Lawrence Nolan ed., *Primary and Secondary Qualities: The Historical and Ongoing Debate* (Oxford: Oxford University Press 2011), 110. The expression quoted below in the main text comes from the same essay.

[11] *Regulæ* VIII; AT X 397, 26-27.

that his grasp of the matter was limited and insufficient by itself to decide, for example, whether bodies are colored or not, whether the mind is immortal or not, whether non-rational animals too have a mind (or not). With regards to the last point, by way of instance, Descartes' considered view was not – contrary to what is usually argued – that non-rational animals *do not have* a mind, but only that it *cannot be proven* that they have one, since their entire behavior can be explained in purely mechanist terms. "The human mind does not reach into their hearts", remarked Descartes, so that it cannot be ruled that non-rational animals do in fact have thoughts. In the absence of a reason to do so, Descartes however concluded that they had none by appealing to a principle of parsimony: Descartes' razor.

In my view, this is precisely the strategy adopted by Descartes in order to prove that material objects are *nothing but* extended things. Since (he thought) his theory of perception enabled him to account for the full content of sense-perception without appealing to nothing but geometrical properties in bodies and the inner constitution of the mind, there were indeed no reasons left to posit real qualities such as redness and similar ones as claimed by the Scholastics of his time. In the *Meditations* Descartes claimed to have a clear and distinct understanding of bodies *as extended objects*, from which he argued that bodies (provided they exist – a thesis he thought he could prove) are extended. He complained, though, that we are on the other hand in the dark about the nature of colors and all the remaining non-geometrical features of bodies. So opaque are these features to our understanding, that for Descartes it could not be established by simply considering what we know of these features what they really are: "I think of these only in a very confused and obscure way, *to the extent that I do not even know whether they are true or false*, that is, whether the ideas I have of them are ideas of real things or of non-things".[12] Lacking a "clear and distinct" understanding of colors, the matter remains indeed problematic, for better *and* for worse. It is precisely at this point, it is intended to be shown, that Descartes thought that the enquiry had to move from 'first' to 'natural' philosophy, from ideas to dissections.

Heavily influenced on this point by Descartes, Boyle and Locke too were later to distinguish between two classes of properties of bodies, the so-called "primary" and "secondary qualities" (extension being an exemplary instance of the former, color of the latter), arguing that only in the case of primary qualities the corresponding ideas are indeed *similar* to the qualities – i.e. to the object's properties – which gave rise in the mind to these ideas. Bodies would thus be extended as we perceive them to be, whereas they would not have the color-properties we tend to ascribe to the them on the basis of what we see. For Locke and Boyle there is indeed

[12] *Meditationes* III; AT VII 43, 23-26; CSM II 29* (emphasis added).

something real in bodies (the texture of their surfaces, basically) which bring about color-sensations in the perceiver. They claimed, though, that what brings about a sensation of red is not itself red, as it was the case with the *rubedo* of late Aristotelians – the object's "redness", its actual and literal "being red". Descartes would have subscribed to virtually all Boyle's and Locke's claims, but we would have immediately urged that the reasoning by which the ideas of features like extension and shape are proven to be "similar" to the corresponding features of the object is not the same by which one can prove that this is *not* the case as regards the ideas of color and all purely sensory features. Nor does the former thesis entail the latter. Even more basically, Descartes would have objected that the starting point of any enquiry into the nature of bodies has to move from the *ideas* the perceiver has of these bodies. Descartes, accordingly, has never spoken of "primary" and "secondary *qualities*", whereas he claimed that one of the fundamental accomplishments of the *Meditations* was precisely to have told apart the "primary *ideas*" from all second-rate notions.[13] This radically different approach – as far as both the *method of enquiry* and the *logic of the argument* in its favor are concerned – to one of the most fundamental issues of Early Modern metaphysics, earns Descartes an outstanding place in the history of philosophy and of science. This is not a novel claim; what is new in this work is the explanation of why Descartes truly deserves it.

The present work is structured according to what I regard as the two fundamental stages of Descartes' argument. A first part spelling out Descartes' argument that bodies are *res extensæ*, is thus followed by a second one expounding on Descartes' argument that colors and similar features are to be excluded from the properties of material substances. In Descartes' own terms, the first stage of the argument is to be taken as an argument from 'first philosophy' and is accordingly at the center of Descartes' *Meditationes de prima philosophia*. The latter stage, on the other hand, falls under what at the time was called *philosophia naturalis*, which was taken to encompass a vast array of disciplines that we would regard today as distinct, ranging from physics in the strict sense of the term to physiology. It is indeed difficult for us today to find a term which could perfectly capture what Descartes was doing in the *Dioptrics*, in the *Meteors* and in the last two books of the *Principles* (where the argument that bodies are nothing but extended substances is presented).

In order to reconstruct the former stage of Descartes' argument – the argument from 'first

[13] *Responsiones* V; AT VII 361, 23 - 362, 4: "Quod denique addis, non tam de veritate regulæ esse laborandum, quàm de Methodo ad dignoscendum an fallamur necne, cùm existimamus nos aliquid clare percipere, non inficior; sed hoc ipsum accurate a me præstitum fuisse contendo suis in locis, ubi primum abstuli omnia præjudicia, & postea *enumeravi omnes præcipuas ideas, ac distinxi claras ab obscuris aut confusis*" (emphasis added).

philosophy' – I take as my leading thread the *Meditations*, to which Descartes referred his readers already at the time of the *Discourse* and to which he kept on referring them even after having written the *Principles*. Descartes made in fact clear in a number of places that only the *Meditations* were to be regarded as the ultimate source of his considered views in that domain. Its first part does therefore mainly consist in a painstaking study of the *theory of ideas* as defended by Descartes in the *Meditations*. It was indeed precisely to the theory of ideas that Descartes appealed to ground his claim that the essence of material substances consists in extension. According to Descartes, the rigorous demonstration of this claim required in fact to delve deeply into the nature of our mental representations and to draw some very fine-grained distinctions between them. It was with this intention in mind that Descartes reworked the concept of a "formal" and "objective" reality of ideas and distinguished between "factitious", "innate" and "adventitious"; "intellectual", "imaginary" and "sensory"; "clear and distinct" as opposed to "obscure and confused" ideas. All these concepts contributed in different ways to Descartes' demonstration that the essence of bodies is extension: how these notions and the related taxonomies were intended by Descartes to work, and to work together, is therefore the main topic of the first part of this work.

The second step of the argument – the 'natural philosophical' argument – is on the other hand (and comprehensibly enough) only sketched in the *Meditationes de prima philosophia*. In the 1641 work, Descartes himself referred in this case his readers to the *Essays* and to the general physical treatise what he meant to publish as soon as possible. In order to disprove Scholastic metaphysics and prove that bodies are nothing but extended substances, Descartes claimed in fact that an alternative account of perception was required, an account that demanded to study in great detail the physiology of the sense-organs and of the nervous system). Descartes himself expressly singled out the explanation of the visual process as the first and best example he could provide and had indeed provided of the argument he had in mind:

> The principal argument which induced philosophers to posit real accidents was that they thought that sense-perception (*sensuum perceptiones*) could not be explained without them, and this is why I promised to give a very detailed account of sense-perception in my writings on physics, taking each sense in turn. Not that I want any of my results to be taken on trust, but I thought that the explanation of vision which I had already given in the *Dioptrics* would make it easy for the judicious reader to guess what I was capable of accomplishing with regard to remaining senses.[14]

[14] *Responsiones* VI; AT VII 435; CSM II 293.

In order to prove that bodies are nothing but extended things, Descartes thought he had in fact to move from phenomenology to dissections, from the investigation of ideas to the study of eye anatomy. Hence the title of the work, which aims at showing that the interplay between *prima philosophia* and *philosophia naturalis* in Descartes' system runs even deeper than it has been assumed. This work intends to show that the incorporation in one line of reasoning of the most refined theoretical speculations and of some extremely meticulous and self-performed empirical researches is indeed the defining and most splendid trait of Descartes' theory on the nature of bodies, if not of Descartes' philosophy as a whole.

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Before concluding, a few words about the temporal scope of this work are in order. The argument that bodies are nothing but extended substances studied in what follows is the argument as presented by Descartes in his "mature" philosophical writings, from the 1637 *Essays* (*Discourse* included) to the 1644 *Principles of Philosophy* via the 1641 *Meditations*. Descartes remained convinced of the main lines of this argument till the end of this life, as attested by the 1647 French translations of the *Meditations* and the *Principles*, both authorized and (at least partly) revised by Descartes himself. If the 1649 *Passions of the Soul* do not mention the argument this has in fact to do only with the different topic of the work. In §4, I show contrary to received views that the taxonomies of ideas presented by Descartes in the 1648 *Notes on a Certain Broadsheet* do not in fact contradict the account of the *Meditations*. The analysis of some all-important letters of the late 1640s – most notably of all to Arnauld and More – substantiates this claim even further (Descartes, just a quick reminder, was born in 1596 and was to die in February 1650).

The question is rather whether the two-step argument for which I make a case in this work was proper to Descartes' mature philosophy or can be traced back to his earlier writings: the *Rules*, namely, and *The World*. The matter is especially tricky since it is not even certain when exactly these works were written. The traditional dating of the late *Rules* to 1628 has indeed been recently called into question by some very authoritative scholars such as Theo Verbeek and Daniel Garber, mostly in the light of a new manuscript of the work recently found in Cambridge by Richard Serjeanston – the so-called *Ur-Regulæ* – which would seem to represent an early stage of the text. Verbeek and Garber have accordingly suggested (independently of each other, and on different grounds) that the *Rules* as we have known them so far were written between the *Discourse* and the *Meditations*, that is, between 1637 and 1640. I think there are however good

reasons (some of which taken precisely from Descartes' physiology; see §24) to stick to the traditional dating.[15] Unfortunately, any close re-examination of the affair has to wait till the long-expected edition of the *Ur-Regulæ* will finally be issued, and will have therefore to wait for a better day.

The dating of *The World* too is no less problematic: edited only posthumous in 1662 (in Latin) and in 1664 (in French) we do not know in fact whether the text as we know it corresponds point by point to the work Descartes completed in 1633 and that only Galileo's condemnation prevented him from publishing. There are indeed some clues (for example the two different accounts of the visual process presented in the text) that Descartes reworked the manuscript also in the 1640s.[16] The problem of the *Rules* and of the *World* would indeed deserve a study of its own, as confirmed once again by Schuster's recent and imposing work on this early stage of Descartes' philosophy.[17]

In what follows, therefore, the writings traditionally dated before 1637 are mostly considered only insofar as they permit to illuminate Descartes' mature works, without however aiming at reconstructing in detail the entire evolution of Descartes' thought on the issue. In §26, still, I show that some early formulations of Descartes' mature argument that bodies are nothing but extended substances can be seen at work already in the *Rules* and in *The World*, even though only in a much less articulated form. Descartes' two-step argument to deny to material object any properties other than geometrical properties appears indeed to be an essential piece not only of Descartes' mature philosophy, but of Descartes' philosophy *tout court*.

[15] See the forthcoming *Proceedings* of the conference "Descartes and *Ingenium*" (Cambridge, 14-15 March 2016).

[16] As argued on different grounds by Rosaleen Love, "Revisions of Descartes' matter theory in *Le Monde*", *British Journal for the History of Science* 8/2 (1975): 127-37. See also Peter Machmer – J. E. McGuire, *Descartes' Changing Mind* (Princeton, NJ: Princeton University Press 2009), 15-16.

[17] John Schuster, *Descartes' Agonistes: Physico-mathematics, Method & Corpuscular-Mechanism, 1618-33* (Dordrecht: Springer 2013).

I. The I and the Ideas

A Phenomenological Reading of the *Meditations*

"I have put no title on my Metaphysics, but it seems to me that the most proper would be *Renati Descartes Meditationes de prima Philosophia*, because I do not confine my discussion to God and the soul, but deal in general with all the first things that can be known by philosophizing".[1] The proofs of God's existence and the demonstration that the soul – or, as Descartes usually prefers to call it, the mind – is a substance, capable of existing of its own independently of the body, were indeed the highlights of the work, duly singled out by the title eventually approved by Descartes.[2] Yet, Descartes wanted to make clear that his "Metaphysics" contained much more. As he confessed in his letters, among the other things it also contained, cunningly concealed, "all the foundations of his physics".[3] If Descartes had originally devised a quite general title for his major work, this was not only in order to encompass as great as possible a number of subjects, though. The manifold topics treated in the work have in fact a fundamental feature in common: they are, so claims Descartes, "les premières choses qu'on peut connaître en philosophant". The mind and God will actually prove to be the very first entities the meditating subject comes to know, but it is only in virtue of this *epistemological* priority – as opposed to an *ontological* one – that Descartes took them as the prime objects of his enquiry.

Spinoza is reported to have once illustrated the novelty of Descartes' philosophy by remarking that "most begin their philosophy from creatures. Descartes began from the mind".[4] The relation between subject and object was so deeply affected by this change in perspective that the words themselves ended up switching their meaning: with Descartes the foundation of the fabric of the world – the *subjectum* – was no longer taken to be the bodies out there as it had been the case for Aristotelians, but the I, the *ego* who could state with utmost certainty *ego cogito, ergo sum, sive existo*. Spinoza, who had spent so many years on Descartes' texts, had perfectly

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[1] To Mersenne, 11 November 1640; AT III 235; K 157*.

[2] *Renati Des-Cartes Meditationes de Prima Philosophia, In quibus Dei existentia, & animæ humanæ à corpore distinctio, demonstrantur*. As well-known, the subtitle of the 1641 Paris edition (decided by Mersenne, who had been appointed by Descartes to supervise the editing) read *in qua Dei existentia, & animæ immortalitas demonstrantur*. Descartes protested that this was not what the work was about, and changed it accordingly in the 1642 Amsterdam edition, which is said to be intended to prove the "distinction of the human soul from the body" rather than the soul's "immortality" (for Descartes' views on the topic see §15). On the title *affaire*, see Theodor Ebert, "*Immortalitas* oder *Immaterialitas*? Zum Untertitel von Descartes' *Meditationen*", *Archiv für Geschichte der Philosophie* 74/2 (1992): 180-202 and, more recently, C. F. Fowler, *Descartes on the Human Soul: Philosophy and the Demands of Christian Doctrine* (Dordrecht: Kluwer 1999), 35-52.

[3] To Mersenne, 7 February 1641; AT III 298; K 173.

[4] While reserving for himself one more different (and, to Spinoza's eyes, more appropriate) starting point: "I begin from God"; cf. Leibniz, *Über Spinozas* Ethik; A III 33_4; 385, 5-6: "Vulgus philosophiam incipere a creaturis, Cartesium incepisse a mente, se incepere a Deo". Spinoza's statement was reported to Leibniz by Tschirnhaus.

captured the gist of Descartes' novel approach, provided his account is not taken to mean that Descartes launched his philosophy from the mind *as an object*: the starting point of Descartes' philosophy is not indeed the mind as a thinking *thing*. Descartes will eventually prove that the mind is indeed nothing but a *res cogitans*, namely, something that can exist on its own (God's "natural concourse" aside) apart from the body, but this result is only achieved in the very last of the six *Meditations*.[5] Descartes began from the mind – from the pure mind or, as he also called it, the intellect – because "nothing can be known prior to the intellect, since knowledge of everything else depends on the intellect", as he claimed already in his first extant philosophical work.[6] The nature and scope of our cognition – *quid sit humana cognitio & quousque extendatur* – is therefore, according to Descartes, the first question to be asked and, accordingly, the proper object of the 'first philosophy' addressed in the *Meditations* and in the first book of the *Principles*.[7]

'First philosophy' was accordingly construed by Descartes as an enquiry into "The Principles of Human Knowledge", as he thought that only through such an enquiry could the existence of God and of the external world, as well as the real distinction between mind and body, be established once and for all.[8] Descartes' *prima philosophia* cannot therefore be simply equated with metaphysics as we understand today of the term, since this would badly distort the entire sense of Descartes' project. Descartes made clear that in order to establish whether God – actually, whether anything other than the meditator himself – exists, the first thing one has to do was to "classify all his thoughts into definite kinds".[9] By so doing, Descartes came to

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[5] The point is made especially clear by Descartes in *Meditationes*, *Præfatio*; AT VII 7, 20 - 8, 15. The literature about how Descartes intended to draw this conclusion is immense. An insightful starting point in the debate is still provided by Marleen Rozemond, *Descartes' Dualism* (Cambridge, MA: Harvard University Press 1998). The best analysis of the different stages of the argument is possibly the one offered by Sergio Landucci, *La mente in Cartesio* (Milano: FrancoAngeli 2002), 55-82.

[6] *Regulæ* VIII; AT X 395, 22-24; CSM I 30: "nihil prius cognosci posse quam intellectum, cum ab hoc cæterorum omnium cognitio dependeat".

[7] *Ibid.* AT X 397, 26-27.

[8] As well-known, *De principiis cognitionis humanæ* is the title of the first book of the *Principia*. On the issue see also *Principes de la philosophie*; AT IX-2 16: "Puis, enfin, lorsqu'il m'a semblé que ces traités précédents avaient assez préparé l'esprit des lecteurs à recevoir les *Principes de la Philosophie*, je les ai aussi publiés et j'en ai divisé le livre en quatre parties, dont la première contient les Principes de la connaissance, qui est ce qu'on peut nommer la première Philosophie ou bien la Métaphysique: c'est pourquoi, afin de la bien entendre, il est à propos de lire auparavant les *Méditations* que j'ai écrites sur le même sujet".

[9] *Meditationes* III; AT VII 36, 30- 37, 1; CSM II 25*: "Nunc autem ordo videtur exigere, ut prius omnes meas cogitationes in certa genera distribuam". Significantly expanded in the French authorized translation to make the point even clearer: "Et afin que ie puisse avoir occasion d'examiner cela sans interrompre l'ordre de mediter que ie

single out the ideas in the proper sense of the term from the more complex modes of thinking (most notably of all, judgments) and drew the well-known distinctions between the formal and the objective reality of an idea, as well as between innate, factitious and adventitious; intellectual, imaginative and sensory; clear and distinct and obscure and confused ideas.

According to Descartes to determine whether something exists (*an sit*) is indeed first of all necessary in order to determine what this thing actually is (*quid sit*). In his views, no question concerning the existence of anything can in fact be meaningfully asked without having first enquired into the *essence* of the object in question. For Descartes (as argued in what follows) what ideas represent is however precisely the *essence* of the objects they are ideas *of*, this being what Descartes meant by speaking of the "objective reality" of an idea. Descartes' theory of ideas is not therefore to be understood as an essay in psychology, but as a *Wesenlehre* – that is, as no less than a "theory of essences".

The concept of "objective reality" (the idea's being an idea of something, as opposed to its being a mental item – i.e. an idea of the mind – what Descartes' calls its "formal reality") is yet far from exhausting the system of taxonomies worked out in the *Meditations* to study how these objects of thought are given to the mind and how the mind comes to apprehend them. It was precisely with this intention that were introduced the celebrated concepts of a "clear and distinct" and of an "obscure and confused" perception, which have been traditionally taken as the exemplary notions of Descartes' method of enquiry when not of Descartes' philosophy as such.

A close examination reveals however that Descartes made use of these concepts only as some sorts of short-hands for a complex line of reasoning entirely based on his theory of the faculties of the mind and, more specifically, on the distinction between "intellectual", "imaginative" and "sensory" ideas. This does not moreover apply only to the ideas of material objects. Descartes, in fact, couched in terms of "clear and distinct perceptions" also his theory of how the basic metaphysical principles come to be recognized as such and apprehended. At the bottom level, however, Descartes argued (or, at least, so I argue) that these notions must be true inasmuch as the *faculty* responsible for perceiving them is the highest power of the mind, so that "there cannot be another faculty I can equally trust as this natural light, and which could teach me that what is revealed to me by this natural light is not true" (so that if this were the case, my entire mental setting would prove to be intrinsically defective, a scenario that Descartes rules out by claiming that it was the most perfect – and thus non-deceptive – being to build the

me suis proposé, qui est de passer par degrez des notions que ie trouveray les premieres en mon esprit à celles qui i'y pouray trouver par après, il faut icy que ie divise toutes mes pensées en certains genres" (AT IX-1 29).

human mind the way it is).[10] Also in the light of the *Meditations* argument for the existence of external bodies (on which much is said in the sections to come) one comes indeed to realize that Descartes has never intended to ground his philosophy a highly-selected set of *intuitions* (for how much clear and distinct and exquisite they could have been), but to establish a *system of reasons*, wherein intuition is to be accepted only in case reason has proven it to be the best reason we might have. The philosopher of "clear and distinct perceptions" is therefore as far as possible from being an intuitionist, even of sorts. If Descartes' theory of ideas is indeed essentially a *Wesenlehre*, it is not however grounded on a *Wesensschau*. An analogous move from the *single item* of perception to the *systematic relations* between them is also at the basis of Descartes' criteria to tell apart sense-perceptions from imaginings (thereby dispelling the doubts of the so-called "dream argument"): as shown in §8 Descartes thought that any distinction between the two in terms of a mere difference in "psychological vivacity" – as Hume was later to defend – fell indeed short of the task.

Descartes' theory of ideas is indeed even more sophisticated than it is usually realized. Its subtleties can be especially appreciated by considering Descartes' distinction between factitious, innate, and adventitious ideas, one more distinction that is usually regarded as primitive. The entire point of this distinction, it has been argued, was to have the argument of the *Meditations* started by telling apart ideas according to their (purported) origin: might these mental representations have been made by the mind, been inborn in the mind, or coming from outside the mind. At a closer look, one comes however to realize that Descartes only *inferred* that our ideas could come from different sources based on the subject's experience that in some cases he is able to freely determine both the idea's place in the timeline of his thoughts *and* its representative content; in some others only the former; in some other cases, finally, neither of these. Far from being assumed as primitive, the distinction between factitious, innate and adventitious ideas on which Descartes rested so great a part of his philosophy – among which, just to name the most obvious instances, the existence of God and of the external world – is indeed the result of a sophisticated phenomenological investigation into the interplay between the willing and the perceiving faculty (the intellect in the broad sense of the term), which Descartes had in turn distinguished as the mind *qua* active and *qua* passive.

Although unknown to Descartes, the term 'phenomenology' appears in fact as the most apt to describe what Descartes is doing in the *Meditations*, at least in its earlier stages. The major exponent of the philosophical movement that goes under this name referred indeed explicitly to Descartes as its (albeit almost unintentional) founder, and accordingly entitled one of his last

[10] *Meditationes* III; AT VII 38, 23 - 39, 1; CSM II 26-27.

works *Cartesianische Meditationen*. Descartes, without doubt, was not Husserl, and his first intention was clearly not to consider ideas independently of whether the objects these ideas are about exist or not *in rerum natura*. As already pointed out, some of Descartes' overriding concerns in the *Meditations* were indeed to prove the existence of God and of the outside world – two very strong existential claims, if any. Still, as a matter of fact, *as long as the doubt concerning the existence of external objects is in force* Descartes' meditator finds himself precisely in the situation of "putting into brackets" the existence of everything, to describe from the *first-person* point of view how he *experiences* objects to be, without being concerned for the time being whether they are such or not, or whether they are there at all or not (this method of philosophical enquiry been usually known as the phenomenological *epochè*). This is indeed the consequential outcome of Descartes' argument that any philosophical enquiry is not to start from the thinking substance *qua substance* but from the subject's *experience*, the term being taken as to encompass the vast range of the subject's entire mental life: his certainties as well as his doubts, what he thinks to know and what he is uncertain about, his wishes and his passions, his imaginings as well as his sense-experiences. Descartes' announced this approach already in the first word of the *First Meditation*, which sets so to say the fundamental chord on which the entire work will be based: "*Animadverti* jam ante aliquot annos": "I have noticed", "I have given heed to" or, even better, "Since a few years, I have directed my mind to the fact that…"[11] The reason why Descartes referred to the *Meditations* both as "his metaphysics" and an enquiry into "the first things that can be known by philosophizing" (not to say as a treatise *de principiis cognitionis humanæ*) was not out of sloppiness. It was simply that Descartes could not be content with any of the received terms at his disposal, since the meaning associated with them after so many centuries necessary failed to fully capture his novel approach. The subject matter and the method of the *Meditations* is indeed neither phenomenology *per se*, nor metaphysics, but what Descartes called *prima philosophia*. The term was not Descartes', and dated back to many centuries before. What Descartes meant by it was on the other hand largely unprecedented, as it should come clear in the chapters that follow.

Descartes' investigation at the beginning of the *Meditations* can therefore be legitimately understood as an exercise in phenomenology. Throughout this work the term is used – in opposition to metaphysics – to designate Descartes' investigation of the mind, its faculties and ideas and of how they all relate, carried on (i) from the first-person perspective and (ii) by remaining non-committal to any existential claim. The distinction between "metaphysics" and

[11] *Meditationes* I; AT VII 17, 6; CSM II 17 translates it as "I was struck by". The French authorized translation, for its part, renders *animadverti* as "je me suis apperceu" (AT IX-1 13).

"phenomenology" enables to better appreciate how Descartes' argument unfolds, and to respect its logic without illegitimately project onto the early *Meditations* the results of the last ones – if not of Descartes' later works. This has been for example the case, just to name an outstanding instance, with the concept of the "material falsity" of sensory ideas discussed in the *Third Meditation*. Most scholars have indeed appealed to this concept in order to explain in which sense, *given that for Descartes bodies are not cold*, the idea of cold can be taken to "misrepresent" its object. The problem with any readings along these lines is however that they turn without noticing the *explanandum* into the *explanans*, as they *assume as already established* that for Descartes bodies are shaped but neither hot nor cold, whereas the concept of a "material falsity" of sensory ideas had been introduced by Descartes precisely with the intention to *insinuate* that this is the case (not even to *prove* it; see §15).

In order to avoid any *hysteron proteron* of this sort, the only strategy to adopt is therefore to follow as closely and as attentively as possible what Descartes himself called the *ordre des raisons* as opposed to the *ordre des matières*:

> It should be noted that throughout the work the order I follow is not the order of the subject-matter, but the order of the reasoning. This means that I do not attempt to say in a single place everything relevant to a given subject, because it would be impossible for me to provide proper proofs, since my supporting reasons would have to be drawn in some cases from considerably more distant sources than in others. Instead, I reason in an orderly way from what is easier to what is hardest, making what deductions I can, now on one subject, now on another. This is the right way, in my opinion, to find and explain the truth. The order of the subject-matter is good only for those whose reasoning is disjointed, and who can say as much about one difficulty as about another. So I do not think that it would be useful, or even possible, to insert into my *Meditations* the answers to the objections which may be made to them. That would interrupt the flow and even destroy the force of my arguments.[12]

In case one takes them as free-floating and self-standing items of doctrine, Descartes' theses would indeed no longer be theses, but just some unwarranted statements. If even "clear and distinct perceptions" are for Descartes worthless of their own but come to have a value only in the light of a comprehensive survey into the powers and limits of the mind, this must therefore be *a fortiori* true for what Descartes took to be the ultimate results of his enquiry. "The eyes of

[12] To Mersenne, 24 December 1640; AT III 265-66; K 164-65. Martial Gueroult has insisted more than anyone else on the importance of this distinction and defended this method as the only correct way of approaching the *Meditations*, to the point of entitling his study of this work *Descartes selon l'ordre des raisons* (Paris: Aubier-Montaigne 1968).

the mind, by which the mind sees and observes everything, are the demonstrations themselves":[13] this superb remark of the *Ethica* could have been made his own by Descartes. The reason why Descartes argued against the "geometrical order" in presenting philosophical theses, was not indeed because he found it too strict, but because to his eyes not even the "geometrical order" was strict and cogent enough for what he took to be the first of all first sciences – *prima philosophia*. Contrary to what happens to be the case with mathematics (at least as Descartes understood of it), Descartes argued that in philosophy the main difficulty is indeed precisely to single out the basic notions and axioms from which the enquiry is to start, this being the task he had set for himself in the *Meditations*.[14]

As the *Synopsis* which opened the work explained, the argument that the essence of bodies consists in extension was the most noticeable instance of Descartes' refusal "to say in a single place everything relevant to a given subject". In order to "establish the distinct concept of corporeal nature", Descartes pointed out to the reader that no less than half of the book would have been needed and, more specifically, the *Second*, the *Fifth*, and *Sixth Meditation*.[15] Descartes' argument is indeed extremely articulated, so that the entire first part of this work is devoted to spell it out as it deserves to be. As the passage on the *ordre des raisons* suggests, and as any reader of the *Meditations* knows, many other arguments are however taking place in the very same *Meditations* and, at the same time, to appreciate what is going on in the last pages of the work one does sometimes need to go back to the *First Meditation*. Any interpreter seems thus to be faced with two opposite threats, in case he or she wants to study one of the arguments of the *Meditations* like the one just mentioned. On the one hand, singling out nothing but the portions of the text immediately relevant for the issue at stake would jeopardize the "order of reasons" and thereby the very comprehension of what Descartes is doing. On the other, if the only way to approach the *Meditations* is taken to require a throughout examination of the entire work, whatever the subject-matter in question, then the only meaningful way of studying the text would seem to be a punctual, line-by-line commentary of one *Meditation* after the other (of which there are already quite a few, some of which excellent). In order to avoid both pitfalls, the first part of this work takes as its leading thread Descartes' taxonomies of ideas, which are

[13] Spinoza, *Ethica* V p. 23 *scolium*: "Mentis enim oculi, quibus res videt observatque, sunt ipsæ demonstrationes" (my translation).

[14] On Descartes' theory of the method of philosophical enquiry, especially in opposition to Euclidean method in geometry, see *Responsiones* II; AT VII 155-59.

[15] *Meditationes*, *Synopsis*; AT VII 13, 13-15: "distinctum naturæ corporeæ conceptum, qui partim in ipsâ secundâ, partim etiam in quintâ & sextâ formatur".

studied one after the other in the order Descartes introduced them (the only exception being, for the reason explained above, the concept of a "clear and distinct perception" and related notions, which are analyzed only at last). Some all-important themes of the *Meditations* are not therefore discussed in detail in what follows: the "ontological argument", for example, or Descartes' doctrine of the mind-body union. Many other studies have been written where these issues are treated at length and with absolute competence. The theory of ideas is not however to be taken as just one chapter among the many of the *Meditations*. For all the reasons explained above concerning Descartes' phenomenological approach, it can indeed be immediately realized that the study of this crucial piece of Descartes' philosophy offers a privileged and illuminating vantage point from which to study the *Meditations* as a whole (beside arguably being the piece of Descartes' philosophy most interesting for the current philosophical debate). Despite its focus on the theory of ideas – and, more specifically, on the ideas of material objects – the first part of the work is indeed intended to offer a new reading of Descartes' masterpiece as a whole: of its strategy, of its method, of its true scope and of its intended limits. Whether this has been accomplished or not, it remains of course to the reader to judge.

The other reason for focusing on Descartes' theory of ideas has obviously to do with the general subject of this work. In order to establish that bodies exist and that they are nothing but extended substances, the method Descartes has set for himself prescribed him in fact first of all to determine what these material object are – that it so say, to study the *essence* of these bodies. As pointed out, however, according to Descartes to study the essence of a thing means to study the *idea* of this thing. More specifically, Descartes' main goal in this regard was to draw a distinction between *two classes of ideas of material objects*: on the one hand extension and its "modes" (most notably of all shape and motion); on the other colors, flavors, odors and so forth. It is by virtue precisely of this distinction between the two classes of *ideas* that Descartes intended to argue on the basis of his 'first philosophy' that extension and related features are in fact real properties of bodies whereas colors and all proper sensibles are *not necessarily* so ('natural philosophy' taking then in to prove that they are in fact not). The justification of such a distinction is therefore the keystone of Descartes' theory of the nature of bodies but is also, at the same time, one of the most misunderstood.

The privileged status of the ideas of shapes over the ideas of colors is usually maintained to consist in the fact the ideas of shape are *innate*, *intellectual*, *clear* and *distinct*, whereas none of these categories would apply to the ideas of colors and similar purely sensory features (here and in what follows "shape" and "color" are taken as exemplary instances of the two classes under question). The categories just mentioned have indeed been assumed by virtually all interpreters

to almost coincide, and the taxonomies to which they belong to collapse onto one another. Innate, factitious and adventitious ideas, it is claimed, would in fact respectively correspond to the ideas of the pure intellect, of imagination, and of sensibility. The notions of the understanding, by the same token, would be the only clear and distinct ones, whereas all imaginative and sensory ideas could not be but obscure and confused. According to this standard reading, Descartes would hence be making use of such a cumbersome apparatus only to better spell out his system of the faculties, by highlighting different features and implications of this threefold partition. At bottom, though, only the distinction between the pure intellect, imagination and sensibility would count.

As it should already be clear from what has been said above, the distinction between factitious, innate and adventitious ideas precedes (in the line of reasoning of the *Meditations*) and cannot but precede the articulation of the one *vis cognoscens* into the intellect, the imagination, and sensibility. In order to establish the latter distinction, the former must indeed be already in place. A distinction that calls upon both the will *and* the understanding (as is the case with Descartes' classification of ideas into factitious, innate and adventitious) is in fact to be logically prior to any one that is intended to distinguish between the sub-faculties of the cognitive power alone – or, as Descartes also calls them, the "functions" of this *vis*. The two three-fold distinctions, once both in place, do not even dovetail, since for Descartes the ideas of the imagination can be both adventitious and factitious, either factitious or innate the notions of the understanding. Nor can the concepts of an obscure, of a confused perception and antonyms be mapped in any straightforward way onto the system of the faculties, since according to Descartes if the appropriate precautions are taken *any* ideas (intellectual as well as imaginative and sensory) can be perceived in a "clear and distinct" way.

Descartes' manifold distinctions between classes of ideas are indeed different, and necessarily so, and all of them are required to understand the argument thanks to which Descartes claimed to have established, after all the manifold and fruitless attempts of his predecessors, "the distinct concept of corporeal nature": the true essence of bodies. It is therefore to these manifold and sophisticated classifications of our mental representations that are devoted the chapters that follow.

§0. Formal and objective reality

Before entering into the specifics of Descartes' classification of ideas, it is crucial to spell out the framework and fundamental notions on which Descartes grounded these taxonomies. Ideas, according to Descartes, can be factitious, or innate, or adventitious; intellectual, imaginative, or sensory; clear and distinct, or obscure and confused. But what is an idea in the very first place, according to Descartes? Whereas for Descartes the distinctions just mentioned are exclusive – meaning that innate ideas are *eo ipso* non-factitious and non-adventitious (and so for the other classes) – for Descartes there is however another key distinction to be drawn, which pertains to *all* ideas simply *qua* ideas: the distinction between formal and objective reality. If by means of the former notion Descartes intended to explain what ideas are from a metaphysical point of view, the notion of objective reality was meant to account for the intentional nature of these mental representations and to provide an answer to the question "what do ideas represent?". The distinction between formal and objective reality is therefore clearly of vital importance for making sense of the distinctions just mentioned and launching the arguments of the section to come: as explained in §1 (just to name an example), the two factors based on which Descartes drew the distinction between factitious, innate and adventitious ideas are indeed ultimately derived from the two-fold nature that according to Descartes is peculiar to all ideas as such, and which he tried to capture by appealing precisely to the opposition between formal and objective reality. Descartes' theory of ideas, as what follows is intended to show, relies nonetheless also on an additional key concept: the concept of the presentational or aspectual character of ideas. It is indeed by appealing to nothing but this notion that Descartes intended to tell apart intellectual and non-intellectual ideas and to make room for the possibility that non-intellectual ideas present the objects they are about as other than they are. Although it remains to the following sections to articulate and justify these claims, it is however crucial to come clear right at the outset about the basic notions of which Descartes makes use in order to "establish a distinct concept of the nature of bodies". In line with the fundamental phenomenological approach of this work, in order to determine the essence of bodies the *Meditations* had indeed to start from the thinker's *ideas* of these objects. Descartes (and we too, if we are to understand him) had therefore first of all to explain what thoughts are and, more specifically, what are these "ideas" of bodies, on the basis of which he intended to prove the bodies they represent are "extended things".

Cogitationis nomine complector illud omne quod sic in nobis est, ut ejus immediate conscii simus. "By 'thought' I designate everything that is within us in such a way that we are immediately aware

of it", so reads Descartes' definition of the most basic concept of his philosophy.[1] Descartes' singling out of the mental – as opposed to the corporeal – through a direct appeal to consciousness is well-known, if not notorious. In recent years, scholars have addressed this crucial tenet of Descartes' theory of the mind from quite different perspectives, arguing that Descartes' philosophy allows and actually even calls for different *orders* and *forms* (or *structures*) of consciousness and working out some sophisticated and more nuanced readings of the gran Cartesian thesis that the mind is transparent to itself (how Descartes intended to establish this "transparency of mind" is discussed in §2).[2] Some of these finer-grained accounts went so far as to argue that for Descartes consciousness, albeit a *salient* feature, is not yet the *definitory* mark of the mental, which should rather be found in *intentionality*. What makes of a though a thought, according to Descartes, would not therefore be the subject's being conscious of this though, but this thought's being *about* something. In recent years more and more interpreters have compellingly argued in favour of this interpretation, which in what follows is therefore taken as established.[3] The first question to be asked about Descartes' concept of thought shifts accordingly from how comes that the perceiver is conscious of what he is thinking to the question about what the perceiver is exactly thinking *of*.

Descartes, and this is well-known too, defended indeed a broad concept of thought (*cogitatio*), which was intended to encompass not only intellections, but also imaginings and sensations, as well as volitions and passions, as he made clear many a time and, most prominently of all, by spelling out the first proposition of his philosophy – the *cogito*, indeed – in these terms:

> Ego sum res cogitans, id est dubitans, affirmans, negans, pauca intelligens, multa ignorans, volens, nolens, imaginans etiam et sentiens.

That is, "I am a thinking thing: that is, a thing that doubts, affirms, denies, understands a few things, is ignorant of many others, is willing, is unwilling, and which imagines also, and

[1] *Responsiones* II; AT VII 160, 7-8; CSM II 113*.

[2] For the main positions on the issue, see at least Vili Lähteenmäki, "Orders of Consciousness and Forms of Reflexivity in Descartes" in Sara Heinämaa – Vili Lähteenmäki – Pauliina Remes eds., *Consciousness: From Perception to Reflection in the History of Philosophy* (Dordrecht: Springer 2007), 177–201 and Alison Simmons, "Cartesian Consciousness Reconsidered", *Philosophers' Imprint* 12/2 (2012): 1-21.

[3] The most recent and sustained defense of this claim is to be found in Christian Barth, *Intentionalität und Bewusstsein in der frühen Neuzeit: Die Philosophie des Geistes von René Descartes und Gottfried Wilhelm Leibniz* (Frankfurt am Main: Klostermann 2017).

senses", to which the French authorized translation was later to add "which loves and hates".[4] All these widely diverse mental operations are sometimes indiscriminately referred to by Descartes as "ideas", but he insisted that properly speaking this notion should be restricted to just one class thereof, namely, to the thoughts that are "the imagines of things, as it were" (*tanquam rerum imagines*), as is the case when I do think "of a man, of a chimera, of the sky, of an angel, or of God".[5] Thoughts other than ideas are indeed characterized by Descartes for possessing "certain additional forms" (*quasdam præterea formas*) – additional, that is to say, to the form which defines the intentional character of ideas, their being thoughts *of* (or *about*) something:

> When I will, or am afraid, or affirm, or deny, in this case too there is always something which I apprehend as the object of my thought, but in these cases I grasp with my thought something more than the likeness of that thing. Of these thoughts, some are called volitions or emotions, while others are called judgments.[6]

Descartes' point is, quite simply, that in the case I want something, I am afraid of something or I affirm something I am not merely *perceiving* a thing but I am also, so to say, "taking a stance" (whether theoretical or practical is at present beside the point) towards it. Descartes, accordingly, made use of "perception" as a perfect synonym of "idea" in the strict sense of the term, making however also clear that "perception" in this sense is not of course to be equated with sense-perception: for Descartes ideas can indeed be intellectual as well as sensory, imaginings as well as recollections.[7] Man's experience is not however confined to perceiving. As Descartes vividly puts it, to see a lion and to be scared of a lion are indeed quite different things, as merely seeing

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[4] *Meditationes* III; AT VII 34, 18-21; CSM II 24*. AT IX-1 27: "qui ayme, qui haït". See also the follow-up of the passage quoted above from *Responsiones* II; AT VII 160, 8-10; CSM II 113: "Thus all the operations of the will, the intellect, the imagination and the senses are thoughts".

[5] *Meditationes* III; AT VII 37, 3-6; CSM II 25*: "Quædam ex his tanquam rerum imagines sunt, quibus solis proprie convenit ideæ nomen: ut cùm hominem, vel Chimæram, vel Cœlum, vel Angelum, vel Deum cogito". See also *Principia* I 17; AT VIII-1 11, 18-19: "objective… sive tanquam in imagine". For Descartes' broad use of the notion of idea, see for example *Responsiones* III; AT VII 181, 5-10.

[6] *Meditationes* III; AT VII 37, 7-12; CSM II 25-26*: "Aliæ verò alias quasdam præterea formas habent: ut, cùm volo, cùm timeo, cùm affirmo, cùm nego, semper quidem aliquam rem ut subjectum meæ cogitationis apprehendo, sed aliquid etiam amplius quàm istius res similitudinem cogitatione complector; & ex his aliæ voluntates, sive affectus, aliæ autem judicia appellantur".

[7] Cf. To Clerselier, 12 January 1646 (*Sur le Cinquiémes Objections*); AT IX-1 210: "Aucune idée, c'est à dire aucune perception". *Responsiones* III; AT VII 185, 19-21: "Notavi sæpius me nominare ideam, idipsum quod ratione evincitur, ut & alia quæ quolibet modo percipiuntur".

a man running away differs from affirming that this is the actually case.[8] Descartes' intention is not to distinguish between non-propositional and propositional items, as a modern interpreter could be induced to assume. According to Descartes the latter distinction is indeed a matter of almost no importance, unable as is by itself even to account for the distinction between intellectual and imaginative ideas (which for Descartes, as shown in §6, count both as non-complex ideas). The crucial point is rather that willing, fearing and affirming have for Descartes some *complex noetic structures*, which add a distinctive feature to the basic intentional character of ideas. The "simple" intentional character of ideas, on the other hand, is according to Descartes so intrinsic and constitutive a feature of ideas (in the strict sense of the term) that ideas cannot even be said to properly *have* this "form", as is the case for the other ways of thinking. Ideas, according to Descartes, simply *are* such a "form of thought", the form thanks to which I think of something and I am *eo ipso* immediately aware of being thinking of that.[9] Consciousness and intentionality are indeed for Descartes the fundamental and inseparable features of the mental, which define ideas in the proper sense of the term and constantly operate as the noetic kernel of all superordinate forms of thinking. Being conscious *and* intentional, ideas can thus be regarded from *two* points of views: as mere mental states, namely, or as mental representations *of* something, two complementary features that Descartes intended to capture by distinguishing between the *formal* and the *objective reality* (or *being*) of an idea.[10]

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[8] *Responsiones* III; AT VII 182, 25 - 181, 1: "Per se notum est aliud esse videre leonem & simul illum timere, quam tantum illum videre; item aliud esse videre hominem currentem, quam sibi ipsi affirmare se illum videre".

[9] *Responsiones* II; AT VII 160, 14-16; CSM II 113: "Ideæ nomine intelligo cujuslibet cogitationis formam illam per cujus immediatam perceptionem ipsius ejusdem cogitationis conscius sum". Hence, he continues, "whenever I express something in words, and understand what I am saying, this very fact makes it certain that there is within me an idea of what is signified by the words in question". See also *Responsiones* III; AT VII 188, 13-15: "me per ideam intelligere id omne quod forma est alicujus perceptionis" and, just a few lines below, "formam, sive ideam intellectionis". *Responsiones* IV; AT VII 232, 12-13: "cùm ipsæ ideæ sint formæ quædam" (to which he adds, being entitled to draw this conclusion once the entire *Meditations* are in place "nec ex materia ullâ componantur"). *Notæ in Programma quoddam*, AT VIII-2 358, 4-5: "ideas sive notiones, quæ sunt illarum cogitationum formæ". For an articulated defense of this reading of the passage from the *Second Replies*, see Dominik Perler, *Repräsentation bei Descartes* (Frankfurt am Main: Klostermann 1996), 59-64, who convincingly argues against Thomas M. Lennon, "The Inherence Pattern and Descartes' Ideas", *Journal of the History of Philosophy* 12/1 (1974): 43-52.

[10] *Meditationes* III: AT VII 40, 21 - 41, 29. In the *Preface* to the *Meditations* (written after the *Meditations* had been circulated and the objections collected and replied), Descartes introduces one more term of art, distinguishing between the idea "taken materially, as an operation of the intellect… or objectively, as the thing represented by that operation" (*materialiter pro operatione intellectûs… vel objective, pro re per istam operatione repræsentatâ*)"; AT VII 8, 20-23; CSM II 7*. Despite the difference in terminology, scholars have convincingly shown that this distinction is tantamount to the distinction between formal and objective reality drawn in the *Third Meditation*, sometimes

As for the former way of being, the *formal* – or, as Descartes also calls it, the *actual* – reality

explaining Descartes' change in vocabulary as intended to circumvent Arnauld-like objections to the concept of a "material falsity"; see for example Emanuela Scribano, "Descartes et les fausses idées", *Archives de Philosophie* 2 (2001): 259-78. Scribano's case is especially compelling if one considers Descartes' reply to Arnauld, where in order to meet his objection Descartes goes as far as to use "formal" to designate what in the *Third Meditation* and everywhere else he calls the "objective" reality of an idea: "cum ipsæ ideæ sint formæ quædam, nec ex materia ulla componantur, quoties considerantur quatenus aliquid repræsentant, non *materialiter*, sed *formaliter* sumuntur; si vero spectarentur, non prout hoc vel illud repræsentant, sed tantummodo prout sunt operationes intellectus, dici quidem posset materialiter illas sumi, sed tunc nullo modo veritatem vel falsitatem objectorum respicerent" (AT VII 232, 12-19). Kurt Smith, though, has argued at length that the distinction between *material* and objective reality is importantly different from the related distinction between *formal* and objective reality; for a summary of Smith's position see his entry "Descartes' Theory of Ideas", *The Stanford Encyclopedia of Philosophy* (online; Winter 2016 edition). Smith himself, however, admits that the distinction between material and objective reality (in case this would not coincide with Descartes' usual one between formal and objective reality of an idea) "is not clearly formulated in the body of the *Meditations*" – not in any one of Descartes' other works, as a matter of fact. Accordingly, in what follows only Descartes' canonical distinction between formal and objective reality will be taken into account. Smith, moreover, also defends one more distinction between Descartes' concept of reality (*realitas*) and of being (*esse*) of an idea. Still, as Smith himself disregards it as negligible even while presenting an account of Descartes' theory that was intended to be as comprehensive as possible – as in the above-mentioned entry – the two notions will be taken as equivalent throughout this work (since Descartes seems indeed to use them interchangeably). Chappell is likely to have been the first one to argue for such a distinction, insisting that for Descartes existing is an all-or-nothing affair whereas reality obtains in degrees; cf. Vere Chappell, "The Theory of Ideas" in Amélie Oksenberg Rorty ed., *Essays on Descartes'* Meditations (Berkeley - Los Angeles - London: University of California Press 1986), 190. Chappell's point is important, and obviously connected with Descartes' understanding of actual existence itself as a "perfection" (*viz.* as one degree of something's "reality"), a thesis violently refuted by Gassendi, who paved thereby the way to Kant's criticism of Descartes' ontological argument. Descartes' main point in introducing the concept of an "objective reality" was nonetheless first and foremost to distinguish a specific *way of existing* (the "objective") from the actual (or formal) one, these being two different "essendi modus", as Descartes writes in *Meditationes* III; AT VII 41, 26-29. Only once this piece of the theory is in place can Descartes move to consider more closely the different ideas *insofar as objectively existing* to argue that they "contain" more or less "objective perfection" according to the kind of being they represent (might it be the most perfect one – God – or just the mode of a finite creature); see for example *Responsiones* II; AT VII 161, 6-9 & 165, 28 - 166, 2 (where Descartes expressly uses "gradus entitatis" as a synonym for "gradus realitatis"). Although Chappell calls attention to a crucial tenet of Descartes' philosophy, it must however be acknowledged that Descartes' usage of the notion of "reality" happens to be more flexible than a commentator would like it to be, and is sometimes used as a perfect equivalent of "being" (*esse*) simpliciter. Anyone familiar with Descartes' writings will not be surprised that he could use *realitas*, *modus essendi*, *esse* and *entitas* as equivalent: the author of the *Meditations* proves in fact in quite a few occasions to be not especially fond of drawing terminological distinctions; see for example the telling "natura, sive essentia, sive forma" (AT VII 64, 15-16) or, analogously, "mens, sive animus, sive intellectus, sive ratio" (AT VII 27, 14).

of a thing is simply the reality that something (in this case, an idea) possesses insofar as is actual, i.e. insofar as it exists. Descartes argues that, as far as the formal reality is concerned, all ideas are on a par, they all being nothing but mental states: "in so far as the ideas are nothing but certain modes of thought, I do not observe any inequality among them: they all appear to come from me in the same fashion".[11] This phenomenological remark – my thoughts are all *my* thoughts – is loaded in a more and more metaphysical sense as the argument of the *Meditations* goes. As the true metaphysical nature of the thinking I comes to light at the end of the enquiry, these modes of thought will indeed eventually reveal themselves for *modi* of the thinking *substance*.

What distinguishes an idea from the other is indeed, according to Descartes, what the idea is about – "a man, a chimera, the sky" and so forth: "on the other hand, it is clear that ideas differ widely between themselves in so far as one idea represents one thing, and another idea a different one".[12] It is precisely in virtue of this intentional character which defines ideas in the most proper sense of the term that Descartes can claim that ideas are *tanquam* (as if) the images of things. The qualification is intended to make clear that by 'idea' Descartes does not mean here a *pictorial-like* depiction, which, as such, could not be but material. Descartes, of course, is not yet thereby simply *presupposing* that the mental representations he is calling the reader's attention to are immaterial: this conclusion is in fact intended to be established only at the end of the work, as a straightforward consequence of the mind-body distinction. Descartes wants however to warn his reader that it would be equally unwarranted to take right away these intentional states for something material, without investigating the issue first. The caveat is in order, since around Descartes' times the word 'idea' referred first and foremost to some bodily impressions; more specifically, to the "images depicted in the corporeal phantasy, that is to say, in a certain portion of the brain".[13] Descartes himself, actually, had employed 'idea' precisely with this meaning in most of his earlier writings. As is standard use among scholars, ideas taken in this sense are referred throughout this work as *corporal* ideas, or as ideas in the material sense

[11] *Meditationes* III; AT VII 40, 7-10; CSM II 27-28*: "Nempe, quatenus ideæ istæ cogitandi quidam modi tantùm sunt, non agnosco ullam inter ipsas inæquilitatem, & omnes a me eodem modo procedere videntur".

[12] *Ibid.* AT VII 40, 10-12; CSM II 28*: "sed, quatenus una unam rem, alia aliam repræsentat, patet easdem esse ab invicem valde diversas". See also *Principia* I 17; AT VIII-1 11, 5-9; CSM I 198.

[13] *Responsiones* II; AT VII 160, 19 - 161, 1; CSM II 113*: "Atque ita non solas imagines in phantasiâ depictas ideas voco; imo ipsas hîc nullo modo voco ideas, quatenus sunt in phantasia corporeâ, hoc est in parte aliqua cerebri depictæ". See also *Objectiones* III; AT VII 181, 2-5. *Objectiones* V; AT VII 366, 18-21.

of the term.[14]

Although it did not come completely out of the blue, Descartes' concept of idea was in fact largely unprecedented.[15] When Hobbes complained that in the *Meditations* the word had just been used idiosyncratically, Descartes replied with *nonchalance* that he had simply applied a concept at use for centuries among philosophers to describe God's way of knowing (*ad formas perceptionum mentis divinæ significandas*) and transposed it to the finite mind in order to investigate how we finite beings cognize.[16] Descartes conceded nonetheless, albeit grudgingly, that this use could cause some confusion in the reader, but he justified his choice claiming that "there was not any more appropriate term at my disposal".[17] As Descartes made clear in the same passage, the main reason that led him to speak of 'ideas' in this new context was in fact to distance as much as possible the mental representations he was considering in the *Meditations* from the material impressions he and his contemporaries had been speaking so much. The forms in the divine mind did thus stand out as the best candidate at hand to forestall any misunderstanding along these lines. No one of Descartes' contemporaries could in fact possibly confuse the ideas in God's mind with the "images depicted in the corporeal phantasy", as virtually all of them took God (provided there was any) to be incorporeal and, therefore, deprived of imagination: we philosophers indeed, writes Descartes, "do not admit any phantasy in God" (*nullam in Deo phantasiam agnoscamus*), neither as an organ – i.e. as an actual portion of the brain – nor, hence,

[14] Especially after Emily Michael and Fred S. Michael, "Corporeal Ideas in Seventeenth-Century Psychology", *Journal of the History of Ideas* 50/1 (1989): 31-48. Descartes' physiological views on these brain impressions will be discussed in §24.

[15] On some forerunners of Descartes' concept of idea, see Norman Wells, "Descartes' Idea and its Sources", *American Catholic Philosophical Quarterly* 67/4 (1993): 513-36. Roger Ariew – Marjorie Grene, "Ideas, In and Before Descartes", *Journal of the History of Ideas* 56 (1995): 87-106. Ariew and Grene conclude their study by admitting that the divergences between Descartes and his (alleged) forerunners are however way more significant than the occasional element of similarity. The notion of objective being was, on the other hand, a standard piece of Scholastic philosophy: on Descartes' reuse of this notion, see at least Norman Wells, "Objective Being: Descartes and His Sources", *The Modern Schoolman* 45 (1967): 49-61. Calvin Normore, "Meaning and Objective Being: Descartes and His Sources" in Amélie Oksenberg Rorty ed., *Essays on Descartes' Meditations* (Berkeley - Los Angeles - London: University of California Press 1986), 223-42. Norman Wells, "Objective Reality of Ideas in Descartes, Caterus, and Suárez," *Journal of the History of Philosophy* 28/1 (1990): 33-61.

[16] *Responsiones* III; AT VII 181, 10-14. On the exchange between Hobbes and Descartes on the topic, see Gianluca Mori, "Hobbes, Descartes, and Ideas: A Secret Debate", *Journal of the History of Philosophy* 50/2 (2012): 197-212.

[17] *Responsiones* III; AT VII 181, 13-14; CSM II 127-28: "nullum aptius habebam". See also To Mersenne, July 1641, where Descartes speaks of a possible "equivoque" among readers (AT III 393).

as a faculty (for Descartes' own theory of the imagination, see §§5-6 below).[18]

Accordingly, whereas in his early writings Descartes took ideas to mean some *forms* or *images* formed *in the brain*, from the *Discours* (1637) onwards he understood of ideas as *notions* formed *by the mind*.[19] In the *Treatise of Man* (1633) Descartes could thus write that in case a rational soul would have been united to the *machine de terre* he had been describing so far, this soul would be able to imagine or sense some object by "immediately considering" the ideas "traced by the spirits on the surface of the gland".[20] In the *Meditations* (1641), on the other hand, he warily granted his objectors that they could keep on speaking of brain-impressions as ideas, not yet *as such* – i.e. simply qua brain-impressions – but only "insofar as they give form to the mind itself when directed towards that part of the brain" where these impressions are located (*tantum quatenus mentem ipsam in illam cerebri partem conversam informant*).[21] Non-sentient beings (as is the case, according to Descartes, for non-rational animals) despite having brain-impressions could not therefore been said to have "ideas" of anything. If brain-impressions too are *caused by* something, mental representations alone can for Descartes be said to *be about* something. By the same token, when Descartes speaks in the *Treatise on Man* of brain impressions "representing" an object, the context makes immediately clear that he only means thereby that there exist an *orderly correspondence* between these brain impressions and their causes (Descartes, accordingly,

[18] *Responsiones* III; AT VII 181, 13; CSM II 127*:

[19] Cf. *Homme*; AT XI 176, 26 - 177, 4; Hall 86-87. For *machine de terre*, see *Ibid.* AT XI 120, 4-5. Cf. *Discours* IV; AT VI 40, 9: "idées ou notions". Apparently the turning out was precisely the writing of the *Discourse*, although even here, while presenting the content of the unpublished *Monde*, Descartes falls back into the standard usage of the term; see *Discourse*; AT VI 55, 14-21. As far as the three appended *Essais* are concerned, the term compares only in the *Dioptrique*, to designate both mental (AT VI 131: "les idées qu'elle [the soul] conçoit") and physiological states (AT VI 144). For the *Meditations* see for examples *Responsiones* VI; AT VII 440, 14. It should be finally pointed out that in the *Rule* IV Descartes uses *idea* with one more meaning, to refer to something like the general outline and basic feature of something (in this case, of two sciences like philosophy and mathematics): "[the Ancients] Philosophiæ etiam & Matheseos veras ideas agnoverint, quamvis ipsas scientias perfecte consequi nondum possent" (AT X 376). This usage was not uncommon at the time, and Giovanni Paolo Lomazzo meant basically the same when he entitled his 1590 treatise *Idea del tempio della pittura*. For a cultural history of the notion, see Erwin Panofsky, *Idea: Ein Beitrag zur Begriffsgeschichte der älteren Kunsttheorie* (Leipzig - Berlin: Teubner 1924).

[20] Cf. *Homme*; AT XI 176, 26 - 177, 4; Hall 86-87 (only referred to in the passage as the "gland H", not yet – not explicitly, at least – as the pineal one).

[21] *Responsiones* II; AT VII 161, 2-3; CSM II 113*. §24 argues contrary to a received tendency to read passages along these lines where Descartes speaks of a "conversion" of the mind to the brain as supporting a "homunculus", "pictorial" or "imagistic" model – all epithets to be found in the literature.

uses in these cases "representer" as perfectly equivalent to "se rapporter").[22] Like brain impressions can indeed be properly qualified as 'representation' only if regarded from the vantage point of the mind attached to the body where these impressions are to be found. Representation, according to Descartes, is indeed ultimately grounded on the concept of objective reality, so that he could define the former notion in terms of the latter, to the point of simply identifying the two, as when he spoke of "cette façon d'estre, par lequelle une chose est *objectivement ou par representation* dans l'entendement par son idée".[23] For Descartes the only representations in the proper sense of the term are indeed *mental* representation, since only "dans l'entendement" can things exist "objectively, that is, by representation".

We are thus drawn back to the second way of existing of ideas, the one peculiar to them and that sets them apart from any other sort of beings (to which only formal reality might belong): the *objective* reality of an idea. Objects, according to Descartes, can indeed be said to exist "objectively" only insofar as they become objects of thought – *viz*. only insofar as they are represented by and to the mind "through an idea" (*per ideam*):

> By the *objective reality of an idea* I mean the entity (*entitas*) of the thing represented by the idea, insofar as this [thing] exists in the idea... For whatever we perceive as being as if in the objects of our ideas, this exists objectively in the ideas themselves.[24]

Or, as he puts elsewhere the point in looser terms, "by the term 'idea' [taken in the objective sense], I mean in general everything which is in our mind when we conceive something, no matter how we conceive it".[25] With a crucial warning in order: Descartes designates by 'objective

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[22] Cf. *Homme*; AT XI 175, 4-14; Hall 85: "just as the different ways in which tubes *2*, *4* and *6* are open trace on the internal surface of the brain a figure corresponding to that of the object *ABC*, so [the different ways] in which the spirits leave the point *a*, *b* and *c* trace that figure on the surface of this gland. And note that by 'figures' I meant not only things that somehow represent (*representent*) the position of the edges and surfaces of objects, but also everything which… can cause the mind (*donner occasion à l'âme*) to sense movement, size…"

[23] Cf. *Meditationes* III; AT IX-1 33. The equivalence of the two notions is at any rate truly Descartes'; see for example *Principia* I 17; AT VIII-1 11, 20-21: "objective sive repræsentative".

[24] *Responsiones* II; AT VII 161, 4-9; CSM 113-14: "*Per realitatem objectivam ideæ* intelligo entitatem rei repræsentatæ per ideam, quatenus est in ideâ… Nam quæcumque percipimus tanquam in idearum objectis, ea sunt in ipsis ideis objective". See also the margin note to the Latin authorized translation of the *Essais*; *Specimina*, AT VI 559: "Nota hoc in loco & in sequentibus, nomen Ideæ generaliter sumi pro omni re cogitatâ, quatenus habet tantùm esse quoddam objectivum in intellectu".

[25] To Mersenne, July 1641; AT III 392-93; K 185: "J'appelle généralement du nom d'idée tout ce qui est dans notre esprit, lorsque nous concevons une chose, de quelque manière que nous la concevions".

being' *what is represented by the idea* (taken in the formal sense – i.e. as a mode of thought) and not the *idea insofar as it represents*, as often claimed. As forcefully argued by Wells, objective being is indeed for Descartes the *res repræsentata*, not the *res repræsentans*.[26] As Descartes points out right away this alternative "mode of being" is however so different from actual existence that the two cannot be even taken to be on a par. According to Descartes, this "ideal" form of existence is in fact to be understood as a way of existing in its own right, for how much "imperfect" and even "way more imperfect" than the formal, standard way in which things happen to be in the world it can be:

> Imperfect though it may be, the mode of being by which a thing exists objectively <i.e. by representation> in the intellect by way of an idea (*per ideam*) is plainly not nothing.[27]

The first objector of Descartes' *Meditations*, Caterus, immediately accused Descartes of having fallen prey of a major confusion: "to be known" or not by a cognizer is completely accidental to the Sun, he objected, so that this "extrinsic denomination" does not count as an imperfect form of being, but as nothing at all, having no grounding *in re*. Descartes readily granted all of Caterus' point. The Sun he had in mind by speaking of its "objective reality" was not indeed the Sun "as is in the sky":

> Now I wrote that "an idea is the thing which is thought of in so far as it has objective being in the intellect" (*ideam esse ipsam rem cogitatam, quatenus est objective in intellectu*). But to give me an opportunity of explaining these words more clearly the objector pretends to understand them in quite a different way from that in which I used them. "To being objectively in the intellect", he says, "is simply the determination of an act of the intellect by means of an object, and this is merely an extraneous label which adds nothing to the thing itself". Notice here that he is referring to the thing itself as if it were located outside the intellect (*tanquam extra intellectum positam*), and in this sense 'to being objectively in the intellect' is certainly an extraneous label. But I was speaking of the *idea*, which is never outside the intellect, and in this sense 'objective being' simply means being in the intellect in the way in which objects are normally there (*esse objective non aliud significat quam esse in intellectu eo modo quo objecta in illo esse solent*).
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> For example, if anyone asks what happens to the sun through its being objectively in my intellect, the best answer is that nothing happens to it beyond the application of an extraneous label which does

[26] Wells, "Objective Reality", 36: "Ideas… taken 'objectively' do not *have* objects; they *are* the objects capable of being represented by the idea taken formally".

[27] *Meditationes* III; AT VII 41, 26-29; CSM II 29: "quamvis imperfectus sit iste essendi modus, quo res est objective in intellectu per ideam, non tamen profecto plane nihil est". The gloss in angle brackets is taken from the French authorized translation; cf. AT IX-1 33 (the same gloss is repeated a few lines below).

> "terminates an operation of the intellect as its object" (*operationem intellectûs per modum objecti terminet*). But if the question is about what the *idea* of the sun is, and we answer that this idea is just the thing which is thought of, insofar as it exists objectively in the intellect (*idea Solis… esse rem cogitatam, quatenus est objective in intellectu*), no one will take this to be the sun itself with this extraneous label applied to it. 'Objectively being in the intellect' does not indeed here mean "to terminate an operation of the intellect as its object", but signifies the object's being in the intellect in the way in which its objects are normally there. By this I mean that the idea of the sun is the sun itself existing in the intellect (*idea solis sit sol ipse in intellectu existens*). Not of course *formally* existing, as it does in the heavens, but *objectively*, i.e. in the way in which objects normally are in the intellect. Now this mode of being is of course much less perfect than that possessed by things which exist outside the intellect; but, as I did explain, it is not therefore simply nothing.[28]

Unfortunately, Descartes' remark that for something to exist objectively means "being in the intellect in the way in which objects are normally there" does not prove very helpful.[29] The ontological status of this "objective being" is indeed likely to be the thorniest issue of Descartes' theory of ideas, as clearly attested among the other things by the fierce dispute between two self-proclaimed Cartesians such as Arnauld and Malebranche on this exact point. Malebranche proposed to solve the difficulty by bringing back ideas from the finite to the divine mind, from which Descartes himself had said to have derived the notion. Arnauld, who on the other hand wanted to retain this important piece of Descartes' philosophy, had in fact to take great pains to resolve the many difficulties to which any account along Descartes' lines seemed to be doomed (Arnauld's dispute with Descartes about the so-called "material falsity" of sensory ideas being the first and maybe most significant instance thereof).[30]

Commentators, accordingly, have worked out quite a few different accounts of how the sun "in the intellect" – i.e. the idea of the sun (the *idea solis* being said by Descartes to be *sol ipse in intellectu existens*) – relate to the sun "in the sky". An exhaustive and reasoned survey of all the different views on the topic would deserve a study by itself, but Descartes' texts and some recent

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[28] *Responsiones* I; AT VII 102, 3 - 103, 4; CSM II 74-75* (emphases added).

[29] As insisted by Andreas Kemmerling. ""As if were pictures" – On the Two-Faced Nature of Cartesian Ideas" in Ralph Schumacher ed., *Perception and Reality: From Descartes to the Present* (Paderborn: Mentis 2004), 43-68, see especially 59-61.

[30] For an insightful study of the dispute between Malebranche and Arnauld in relation to the tensions left unresolved by Descartes' own theory of ides, see Nicholas Jolley, *The Light of the Soul: Theories of Ideas in Leibniz, Malebranche, and Descartes* (Oxford: Clarendon Press 1990). For an overview of the main theories of intentionality in Early Modern philosophy, see Michael Ayers, "Ideas and Objective Being" in Daniel Garber – Michael Ayers eds., *The Cambridge History of Seventeenth-Century Philosophy* (Cambridge: Cambridge University Press 1998), II 1062-107.

contributions seem to outline a quite accurate account of what and how Descartes intended ideas to represent. "The notion of objective reality", it has been recently claimed, "is related to *possible* existence… ideas are individuated by the possibly (rather than actually) existing objects to which they refer".[31] Descartes makes indeed clear at the very outset of the *Meditations* that ideas do not require the actual existence of the objects they are about. He also claimed, however, that "we cannot conceive of anything except as existing" (*nihil possumus concipere nisi sub ratione existentis*): as possibly existing in the case of finite entities, as necessarily so in the same of the supremely perfect being. Being existence a perfection it would indeed be a contradiction in term for the most perfect being not to have it.[32] The case of the idea of God, although absolutely peculiar within Descartes' system, excludes therefore that objective reality could be taken to mean the same as *possible* existence, as argued by De Rosa.

The *Meditations* statements on the matter can however be easily explained and the merits of the reading just mentioned rescued by taking notice that according to Descartes an idea does not represent its object *qua possible*.[33] It rather represents the object's *essence*, as expressly stated by Descartes: *idea enim repræsentat rei essentiam*.[34] The point is make especially clear in a letter written by Descartes in 1645 or 1646, possibly to Mesland, to which Dominik Perler has rightfully called attention:

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[31] Raffaella De Rosa, *Descartes and the Puzzle of Sensory Representation* (Oxford: Oxford University Press 2010), 14 (emphasis added).

[32] *Responsiones* II; AT VII 166, 14-18; CSM II 166. *Meditationes*, *Præfatio*; AT VII 8, 22-25; CSM II 7. See also *Responsiones* I; AT VII 116, 20 - 117, 8; CSM II 83: "But to remove the first part of the difficulty we must distinguish between possible and necessary existence. It must be noted that possible existence is contained in the concept or idea of everything that we clearly and distinctly understand; but in no case is necessary existence so contained, except in the case of the idea of God. Those who carefully attend to this difference between the idea of God and every other idea will undoubtedly perceive that even though our understanding of other things always involves understanding them as if they were existing things, it does not follow that they do exist, but merely that they are capable of existing. For our understanding does not show us that it is necessary for actual existence to be conjoined with their other properties. But, from the fact that we understand that actual existence is necessarily and always conjoined with the other attributes of God, it certainly does follow that God exists".

[33] Meinong's spectre has been evoked – in relation to Descartes' theory of "true and immutable natures" – by Antony Kenny, *Descartes: A Study of His Philosophy* (New York: Random House 1968), 150-56. Even followers of Kenny's reading have however called for qualifications; see Edwin M. Curley, *Descartes Against the Sceptics* (Cambridge, MA: Harvard University Press 1978), 149: "the Cartesian doctrine is one which only resembles Meinong's". On the same line also Gregory Brown, "*Vera Entia*: The Nature of Mathematical Objects in Descartes", *Journal of the History of Philosophy* 18 (1980): 23-37.

[34] *Responsiones* V; AT VII 371, 11-12; CSM II 256.

> By 'essence' we understand a thing as is objectively in the understanding. By 'existence' the very same thing as is outside the intellect (*per essentiam intelligimus rem, prout est objective in intellectu, per existentiam vero rem eandem, prout est extra intellectum*).[35]

The point has been addressed by Descartes quite a few times also in the *Meditations*, obviously enough, not only in the reply to Gassendi quoted above but also, most notably of all – for very obvious reasons – in the course of the demonstration that material objects exist (to be discussed in detail in §2, and once again from a different perspective in §9). The *Fifth Meditation*, tellingly entitled *De essentia rerum materialium*, opens indeed by arguing that

> before inquiring whether any such things exist outside me, I must consider the ideas of these things, insofar as they exist in my thought, and see which of them are distinct, and which confused.[36]

Leaving aside for a moment the final clause, the *Fifth* and *Sixth Meditations* seems accordingly to make crystal-clear that Descartes conceived of his inquiry into the *ideas* of material things as an inquiry into the *essence* of these objects, and this because he took ideas to represent the essence of the objects they are about. It is precisely by considering the objects' essences that Descartes settled indeed for himself to establish whether these objects do necessarily exist – as it turns out to be the case only for God – or only possibly so. By the same token, Descartes' characterized his proof of God's existence from the idea of a supremely perfect being as a proof *per ipsam ejus essentiam sive naturam*.[37]

Descartes' two crucial claims that (i) in order to figure out whether something exist I must

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[35] To Mesland (?), 1645 or 1646; AT IV 351; K 281*. Cf. *Conversation with Burman*, 16 April 164: "cum existentia nihil sit aliud quàm essentia existens". Descartes points out to Mesland that we can of course also think of something specifically *as existing*: "we do indeed understand the essence of a thing in one way when we consider it in abstraction from whether it exists or not, and in a different way when we consider it as existing; but the thing itself cannot be outside our thought without its existence, or without its duration or size, and so on… Thus, when I think of the essence of a triangle, and of the existence of the same triangle, these two thoughts, as thoughts, even taken objectively' differ modally in the strict sense of the term 'mode'; but the case is not the same with the triangle existing outside thought, in which it seems to me manifest that essence and existence are in no way distinct. The same is the case with all universals". For Perler's reading, to which I am strongly indebted, see Dominik Perler, *Repräsentation bei Descartes*, 86-99. Dominik Perler, "Inside and Outside the Mind: Cartesian Representations Reconsidered" in Ralph Schumacher ed., *Perception and Reality: From Descartes to the Present* (Paderborn: Mentis 2004), 69-87, especially 76-77. That the idea of an object represents the object's essence had already been suggested by Alan Gewirth, "Clearness and Distinctness in Descartes", *Philosophy* 18 (1943): 17-36 and, although only obliquely, by Jolley, *The Light of the Soul*, 16-17.

[36] *Meditationes* V; AT VII 62, 12-15; CSM II 44*.

[37] *Responsiones* II; AT VII 120, 10-11 (as contrasted to the proof *per effectus*).

first of all consider the idea of this thing and that (ii) "according to the laws of true logic, we must never ask about the existence of anything (*an sit*) until we first understand its essence (*quid sit*)" come therefore to one.[38] "According to the laws of true logic" reads the 1641 printed versions of the text, but the reply Descartes had submitted to Caterus read in actual fact quite differently, as revealed from an exchange with Mersenne concerning the editing of the text:

> Je vous prie, à l'endroit où j'ai *mis juxta leges logicæ meæ*, de mettre au lieu *juxta leges veræ logicæ*; c'est environ le milieu de mes réponses *ad Caterum*, où il m'objecte que j'ai emprunté mon argument de Saint Thomas. Et ce qui me fait ajouter *meæ* ou *veræ* au mot *logicæ*, est que j'ai lu des théologiens qui, suivant la logique ordinaire, *quærunt prius de Deo quid sit, quam quæsiverint an sit*.[39]

Despite Descartes' attempt to water down *in extremis* the novelty of his philosophy by claiming to have read among some unnamed theologians that this was the right way to argue even as far as God's existence is concerned, the clash with Aquinas and standard Aristotelianism could not be mitigated or even simply put out of sight by a mere change in adjectives, as rightly pointed out by Gilson.[40] Descartes' understanding of the theory of ideas as a *Wesenlehre* – and hence of the investigation of essences in terms of a phenomenology – was indeed breaking as decisively as possible with received Scholastic metaphysics.

This reading, however, it could be resisted, works only as far as *intellectual* ideas are concerned: has not Descartes himself insisted over and over again that the ideas of the senses, the obscure and confused ideas of the senses, misrepresent their objects? In case they represent anything at all, actually. That according to Descartes sensory ideas too do represent has yet been established so firmly by some of the most authoritative scholars in the field (it would be enough to mention here Bolton, Perler, Hatfield, Simmons and De Rosa) to require no further

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[38] *Responsiones* I; AT VII 107, 26 - 108, 1; CSM II 78: "Juxta leges veræ Logicæ, de nullâ unquam re quæri debet *an sit*, nisi prius *quid sit* intelligatur". For one more Descartes' statement concerning the former point, expressly presented as a philosophical principle, see To Gibieuf, 19 January 1642; AT III 476; K 202. "Here we have to recall the rule already stated, that we cannot have any knowledge of things except by the ideas we conceive of them; and consequently, that we must not judge of them except in accordance with these ideas".

[39] To Mersenne, 31 December 1640; AT III 272-73; K 165: "In the place where I put 'in accordance with the laws of my logic', please put 'in accordance with the laws of the true logic'; it is near the middle of my *Replies* to Caterus, where he objects that I have borrowed my argument from St Thomas. The reason why I add 'my' or 'the true' to 'logic' is that I have read theologians who follow the ordinary logic and inquire what God is before inquiring whether God exists".

[40] Étienne Gilson, *L'Être et l'essence* (Paris: Vrin 1948).

argument.[41] Descartes' use of the word *sensation* – or, most commonly, *sensus* – to refer to color-perception should not in fact lead astray and make suppose that Descartes had a non-intentional account of sense-perception: *sensatio* stands in fact to sensory *ideas* the same way *imaginatio* and *intellectio* to the ideas of the corresponding faculties, whereas *sensus* comes directly from *sentire* like *conceptus* from *concipere*. *Sensationes* and *sensus* are for Descartes *cogitationes* and, more specifically, ideas. [42] And for Descartes all ideas represent.

The really pressing question is therefore rather *what* Descartes took sensory ideas to represent, and here too the interpreters' opinions diverged, and widely. The most comprehensive survey of the literature on the topic and most insightful account of Descartes' theory of sensory representation has been provided in recent years by De Rosa, who in my views has positively established that Descartes endorsed an internalist account of sensory perception, to be further qualified in causal terms. As De Rosa has convincingly shown, in line with the scholars mentioned above, that according to Descartes the idea of red does not have the sensation of red as its object nor, *a fortiori*, does the idea of red simply amounts to a sensation of red (to our seeing red – or, to cast the point in adverbialist terms, to our seeing "redly"). Rather, the idea of red "consists in our experiencing red *as a property of body*".[43] It remains however still to established how this representation *of an object* – as opposed to a mere sensation – is achieved. De Rosa argued on the basis of a close analysis of the texts that the intentional character of sensory ideas is not the result of a *judgment*: sensory ideas, according to Descartes, are *intrinsically* representative. How does it come, though, that they represent a body? The parting of the way is between externalist – most notably of all, causal – and internalist accounts. Partly expanding Hatfield's and Simmons' arguments, partly by means of some brand-new ones, De Rosa made a convincing case that causal accounts, independently of the specific causal model

[41] The only passages that would seem to challenge this reading are to be found in the first book of the *Principles*, which led influential scholars such as Wilson and, more recently, Vinci to argue for a change in Descartes' views on the topic between 1641 and 1644. Cf. Thomas C. Vinci, *Cartesian Truth* (New York - Oxford: Oxford University Press 1998). Margaret D. Wilson, "Descartes on the Origin of Sensation", *Philosophical Topics* 19/1 (1991): 293-323. Since the chapters that follow are thematically devoted to the *Meditations* I will not discuss in detail Wilson's and Vinci's readings, which to my eyes have however already been convincingly refuted by the interpreters mentioned above (first of all by De Rosa; see below).

[42] This is clearly the case not only in the *Meditations*, but also in the *Principles*, despite all claims to the contrary; cf. *Principia* IV 192; AT VIII-1 320, 23-27: "Probatur deinde talem esse nostræ mentis naturam, ut ex eo solo quòd quidam motus in corpore fiant, ad quaslibet cogitationes, nullam istorum motuum imaginem referentes, possit impelli; & speciatim ad illas confusas, quæ sensus, sive sensationes, dicuntur" (I come back to the passage in §25).

[43] Raffaella De Rosa, *Descartes and the Puzzle of Sensory Representation* (Oxford: Oxford University Press 2010), 155 (emphasis added).

adopted (was it fully-fledged interactionism or some occasionalism of sorts), fall short of accounting for the intentional character of ideas, their being *about* something. Descartes, indeed, seems to have taken sensory ideas to represent by their own force, as it were, despite making room for some causal element in his account. An important question is still left, though: was Descartes taking the representational character of sensory ideas as *primitive* (as maintained by Pessin), is it somehow determined by the *intellect* (Bolton's proposal), or is there an even more complicated story to be told?[44] De Rosa advanced in fact a very articulated account, which opens by making the case that, according to Descartes, some innate ideas would always be "latently" present in all perceptions. More in particular, in the case of sense-perception this "latent intellectual content" would be provided by the innate idea of a *res extensa*, which would "structure" (in a non-inferential way) color-sensations as to make them the perceptions *of a colored body*.[45] As §§3-4 show, Descartes has nonetheless never mentioned like a "structuring" of sensory ideas by means of the "latent" innate ideas of a body. As it turns out to be the case, he understood indeed of innate ideas in quite different terms. De Rosa, as a matter of fact, advanced this piece of her reading first and foremost to make sense of Descartes' notion of sensory representation in internalist terms without having to assume it as primitive. De Rosa argued for this claim mostly on conceptual grounds, but her elegant speculation does not seem to be backed by the texts.

In order for the main argument of this work to function, *how* exactly Descartes intended to account for the intentional character of sensory ideas, and even whether he took sensory ideas to represent the *essence* of the object they are about or only some features thereof are not deciding issues. For the main argument presented in what follows to work, what is only required is indeed that sensory ideas *represent* the objects they are ideas *of*, a point which I take to have been established beyond any doubt by the scholars mentioned above and that the next chapters substantiate even further. The mere number of competing interpretative strategies just mentioned makes clear that an adequate account of Descartes' theory of representation would in fact require a study by itself. On the other hand, it is possible that an analysis of Descartes' theory of bodies could make better sense of Descartes' theory of sensory perception than most studies thematically devoted to the topic had done. The reason for so bold a claim is that most

[44] See, respectively, Andrew Pessin, "Mental Transparency, Direct Sensation and the Unity of the Cartesian Mind" in Jon Miller ed., *Topics in Early Modern Philosophy of Mind* (Dordrecht: Springer 2007), 1-37. Martha Bolton, "Confused and Obscure Ideas of Sense" in Amélie Oksenberg Rorty ed., *Essays on Descartes' Meditations* (Berkeley - Los Angeles - London: University of California Press 1986), 389-404.

[45] De Rosa, *Descartes and the Puzzle of Sensory Representation* 124-31, 169-74.

accounts of Descartes' theory of sensory ideas have misconstrued this piece of Descartes' philosophy inasmuch as they have failed to consider its intended function within Descartes' overall argument. Most of the contributions in this field open indeed by lamenting that Descartes has never provided a pondered and systematic account of his views on the topic, and proceed to collect his disparate statements to then try their best to square them all. The reason why Descartes has never taken care to provide like an account is however that for him the study of sensory ideas was not of interest for its own sake, but was largely instrumental to determine the nature of bodies and, thereby, to establish the foundations of his physics.

As a consequence, any interpretation *post factum* of Descartes' theory of ideas, which simply *assumes as already established* that for Descartes bodies have shapes but no colors, misses the logic of Descartes' argument and cannot but end up misconstruing some of its steps. Nothing illustrates this point better than the debate concerning the notion of a "material falsity" of sensory ideas. As already remarked in the previous pages, Descartes' point was however precisely to *prove* that bodies are extended and nothing but extended (not cold, therefore) by starting from investigating the *ideas* of these bodies, an investigation of which the doctrine of the "material falsity" is nothing but a piece, and not even so relevant (as shown in detail in §15). By the same token, the obscurity and confusion of colors and analogous ideas cannot be explained by pointing out that for Descartes bodies only have geometrical properties. Descartes' argument works exactly the other way around: the reason why he started to call into question the received views about the physical nature of sensible qualities was precisely because the *ideas* of these qualities were in his views neither "clear" nor "distinct" (on the meaning of these notions, see §§10-11). For Descartes, the *ordre des raisons* must indeed always proceed from the ideas to the objects these ideas are about.

Descartes' understanding of this phenomenological enquiry mostly as an argument for his physics rather than as a discipline in its own right can furthermore explain why he did not apply himself to work out a fully adequate conceptual apparatus to deal with intentionality. The mere distinction between formal and objective reality fails in fact to capture some crucial features of any like a theory, despite Descartes' attempts to forcefully adapt them to this dichotomy. The reference is not here to *intentionale Gegenstände à la* Husserl, for which there seems indeed to be no room in Descartes' philosophy (admittedly, as already pointed out, his concept of an *esse objectivum* does not go without problems, but it would be illegitimate to simply equate his theory with Husserl's).[46] As convincingly argued by De Rosa, the problem with Descartes' concept of

[46] As shown by Perler, "Inside and Outside the Mind", 70-72. See also Paul Hoffman, "Direct Realism, Intentionality, and the Objective Being of Ideas", *Pacific Philosophical Quarterly* 83 (2002): 163-79.

an objective reality is rather that it conflates the *referential* and the *presentational* content of an idea – viz. between *what* the idea is about, and *how* this object presents itself to the mind (the latter features being sometimes also designated as the *aspectual character* of an idea, its representing something *as something*). Descartes clearly acknowledges the presentational character of ideas in a well-known passage about "the two ideas of the sun" of the *Third Meditation*, without nonetheless putting forward any specific term of art for this key notion of any theory of representation:

> Even if these ideas [adventitious ideas] did come from things other than myself, it would not follow that these ideas must resemble those things (*illas rebus istis similes esse debere*). Indeed, I think I have often discovered a great disparity <between an object and its idea> in many cases. For example, there are two different ideas of the sun which I find within me. One of them is acquired as it were from the senses and I would list it more than any else among the adventitious, and this idea presents me the sun as very small (*per quam mihi valde parvus apparet*). The other idea is based on astronomical reasoning, that is, it is derived from certain notions which are innate in me – or else it is constructed by me in some other way – and this idea exhibits me the sun as several times larger than the earth (*per quam aliquoties major quam terra exibetur*). Obviously both these ideas cannot resemble the sun which exists outside me; and reason persuades me that the idea which seems to have emanated most directly from the sun itself is in fact mostly dissimilar to it (*ei maxime esse dissimilem*).[47]

According to Descartes both the everyday *adventitious* and the *non-adventitious* astronomical idea of the sun are indeed ideas of one and the same celestial body. But even though both *represent* the sun, these two ideas happen in fact to *present* it *as* different under many important regards, from which Descartes concludes that it cannot be the case that both ideas present the sun *as it really is* (although it could well turn out to be the case that none of them does, in fact). As the passage reveals, Descartes intends this representation of an object "as the object really is" is terms of *similarity*. Descartes in his writings has unfortunately never provided an account or even simply put forward a definition of this notion. In his first extant writing on philosophy, Descartes actually spoke of "being similar" as a basic notion, among the "simplest and easiest" ones available to the mind.[48] In line with his epistemology and his theory of definitions (presented in §10) Descartes therefore concluded that the notion of similarity cannot be defined,

[47] *Meditationes* III; AT VII 39, 15-29; CSM II 27*. The clause in angle brackets is taken, as usual, from the French authorized translation (AT IX-1 31). See on the same point *Responsiones* III; AT VII 184, 1-17, where Descartes' points out against Hobbes that the notion of idea is not to be restricted to *sensory* ideas.

[48] *Regulæ* VI; AT X 381, 22 - 382, 2; CSM I 21.

nor elucidated, being in fact one of those notions by means of which all other notions are to be made understood.

Since, as already pointed out, Descartes did not conceive of ideas as *pictorial* representations, it can however at least rule out that he understood of the (possible) similarity between the object *as it is* and the object *as presented by the idea* in pictorial terms: ideas, Descartes insisted, are not to be confused with images. Another passage from the *Third Meditation* makes indeed clear that Descartes was thinking of similarity in more abstract terms and that he had a very specific polemical target in mind: the Aristotelian theory of perception. As shown in §21 and following, the Aristotelian account of perception was indeed grounded on the concept of "assimilation". As a matter of fact, it was precisely to ensure that the perceiver could "assimilate" the object's form even in case the object was located at a distance that Scholastics posited the so-called *species* – or *similitudines*, the two terms were taken to be perfectly equivalent – as necessary mediators of the perceptual process. Descartes brings up the issue of similarity precisely while discussing the received theory of perception, claiming – only *claiming*, it is important to point out, not *arguing* and even the less *proving* – that "the chief and most common mistake … consists in judging that the ideas which are in me are similar or conform to things located outside me".[49] Or – switching the perspective – in judging "that the things in question transmit to me their likeness (*similitudinem*) rather than something else".[50] According to Aristotelians (in case no misperception occurs), the object is in fact always perceived *as it actually is*, from which Aristotelians concluded that both triangularity and redness have to count as real properties of bodies, since the perceiver's mental representations do present him the object as both triangular and red. "Similes… sive conformes", as Descartes writes: Aristotelians maintained that (always in case no perceptual error occurs) a mental representation presents in fact the perceiver with the *form* of the object, in one case "realized" in matter, in the other in the soul. The similarity Aristotelians had in mind is in fact to be ultimately understood as a *formal identity* between the mental representation of an object and the object itself.

Thanks to the examples of the two ideas of the sun and, more relevantly, to the argument he was to present in the rest of the *Meditations*, Descartes intended however to show that the adventitious character of sensory ideas could be taken by itself to establish that sensory ideas are similar to the objects from which they come, i.e. that they present it as it truly is. To

[49] *Meditationes* III, AT VII 39, 22-25; CSM II 26*: "Præcipuus autem error & frequentissimus qui possit in illis reperiri, consistit in eo quod ideas, quæ in me sunt, judicem rebus quibusdam extra me positis similes esse sive conformes".

[50] *Ibid.* AT VII 38, 20-22; CSM II 26*.

Descartes' eyes, Aristotelians were in fact guilty of unproblematically *assuming* right from the outset that bodies are indeed shaped, and colored, and with all the manifold qualities our senses apprehend them to be, precisely as we apprehend them to be. Descartes thought that this crucial thesis – which ultimately amounts to an unmitigated realism in perception – could not in fact go without saying, but required a justification. The theory of ideas was Descartes' way to figure out whether there was any.

Descartes did not because of that abandon the claim that sensory ideas too represent. As a matter of fact, given Descartes' very definition of idea he could hardly have done otherwise. As pointed out by Perler, contrary for example to Wilson, it cannot in fact be maintained that sensory ideas have a "representational character" but no "representational object", since mental representations according to Descartes represent only and precisely inasmuch as they have an "objective reality".[51] This objective reality, as already pointed out, is yet for Descartes nothing but the essence of the object the idea is an idea of. If this is the case, though, the very definition of idea would seem to force the conclusion that also sensory ideas have as their intentional object not only the external object in a generic sense, but specifically its *essence*. This is without doubt a truly problematic claim, and puts much pressure on Descartes' concept of representation, into which (in case this reading is correct) Descartes would indeed have built quite a lot. Quite too much, one would be tempted to say. If it has already hard not to be sympathetic with De Rosa's attempt to account for the fact sensory ideas represent by reference to the innate ideas of the understanding in order not to assume their *representationality* as primitive, assuming right from the beginning that sensory ideas represent the object's *essence* seems in fact to be simply over the top.

As mentioned before, the way out of this predicament suggested by De Rosa – and by some other interpreters whose readings are discussed in §4 – was to appeal to an *operation of the understanding*, which would bestow its intrinsic "aboutness" upon sensory ideas. How this alleged "intellectual structuring" of sensory ideas is supposed to be achieved (whether inferentially or not, for example) might be left aside for the time being: what only matters is that even scholars who find problematic the representationality of sensory ideas concede that Descartes seems to have taken representationality as a primitive *at least as far as intellectual ideas are concerned* (not that this does not go without problems of its own, of course, but it is at least generally agreed that this was in fact Descartes' own view). The divide in the Cartesian mind between understanding and sensibility is however taken by these scholars to be so deep that the intentionality of the former, higher faculty would get lost in sensibility, so that it would only by an *operation* performed

[51] Perler, *Repräsentation bei Descartes* 57.

by the understanding that non-intellectual ideas too could come to represent.

As argued in §5, for how much Descartes insisted on the all-important differences between understanding and sensibility this should not however be brought to be point of splitting the essential unity of the Cartesian mind and, by the same token, deny the very possibility of a unified account of mental representations. Descartes argued in fact that sensibility and imagination "include an intellection in their formal concept", and are accordingly to be understood as functions of one and the same *vis cognoscens*, or *facultas cognoscitiva*, which taken by itself amounts to the pure intellect.[52] Indeed, since (as it will come clear from the first part of this work) according to Descartes imagination and sensibility are nothing but *functional specifications* of the cognitive power insofar as embodied, it follows that the (primitive) intentionality of the understanding flows all the way down to imagination and sensibility. Descartes' theory of the faculties, properly understood, reveals in fact that Descartes thought he had *a priori* arguments for defending the intentional character of *all* ideas and the claim that the intentional objects of all ideas is one and the same and thus, more specifically, the essence of the objects these ideas are ideas *of* (as is clearly the case for intellectual ideas). As shown in the next chapters, what for Descartes really sets intellectual ideas apart from sensory ones is not the fact that only intellectual ideas would represent, and represent the essence of the objects they are about. All ideas – intellectual, imaginative and sensory alike – are for Descartes on a par, under this regard. Still, according to Descartes the embodiment of the cognitive power does not leave ideas unaffected. Only as far as the innate intellectual ideas of the understanding were concerned, Descartes thought that it could indeed be demonstrated that these mental representations provide a *crystal-clear insight* into the essence of bodies. That is (always under the proviso that no error occurs), that besides representing the object's essence, they present it to the perceiver precisely *as it is*:

> everything we understand clearly and distinctly is true in the very same way (*eo ipso modo*) in which we understand it to be.[53]

Descartes, to be sure, did not intend to reintroduce to the Aristotelians conception of a *formal identity* between the representing and the represented entity of the cognitive process: the ultimate intention of his theory of representation was indeed precisely to prove that bodies do

[52] *Meditationes* VI; AT VII 78, 21-18; CSM II 54*.

[53] *Meditationes*, *Synopsis*; AT VII 13, 10-12: "ea omnia quæ clare & distincte intelligimus, eo ipso modo quo illa intelligimus, esse vera".

not have a form, but are nothing but three-dimensional chunks of matter. Metaphysical *forms* are indeed according to Descartes to be replaced by geometrical *figures*.[54] Still, Descartes retained at least one crucial piece of the Aristotelian theory of representation: the claim, namely, that a representation is veridical if and only if presents the object precisely as is.[55] Descartes, of course, who thought to have disproven hylomorphism, conceived of the nature of material object in completely different term than the Aristotelians. Unfortunately, though, he never took care to articulate in the light of his alternative metaphysics the claim that "something is said to exist formally in the objects of the ideas when it exists in those objects exactly as (*talia*… *qualia*) we perceive it to be".[56] As a matter of fact, in introducing the very concept of idea, Descartes spoke of it as a "likeness of its object" (*istius rei similitudinem*), and this just a few lines before starting to criticize the Aristotelian account of perception.[57] Foucher and Berkeley strongly objected that there was no meaningful way in which an idea could be said to be similar to an object, and Descartes' writings leave no clear answer about how he would have faced this challenge.[58] As it turns out to be the case, Descartes' chief concern in his theory of representation was not to spell out the sense in which intellectual ideas could be said to be "such as" the objects they are about, but to prove that contrary to Aristotelian philosophy bodies are no such as sensory ideas represent them to be – or, to put it differently, that sensory ideas are *not* similar to bodies.

But how did Descartes intend to establish these two claims? Descartes' argument in favor of the first thesis is that if intellectual ideas would not represent their objects precisely as they are, then, it would have to be concluded that the supreme cognitive power of the human mind is intrinsically flawed, since the human mind would lack the cognitive resources to ascertain how things truly are, while yet being constituted in such a way as to believe that they are in fact otherwise. Descartes thought that these doubts concerning the fundamental reliability of man's cognition could nonetheless be dispelled by appealing to the nature of the *creator* of this cognitive

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[54] For an in-depth study of the concept of figure in Descartes, see Delphine Bellis, *Le visible and l'invisible dans la pensée cartésienne: Figuration, imagination and vision dans la philosophia naturelle de René Descartes* (Ph.D. thesis, University of Nijmegen & Paris-Sorbonne).

[55] To Mersenne, 16 October 1639; AT II 597; K 139: "*truth*… denotes the conformity (*conformité*) of thought with its object".

[56] *Responsiones* II; AT VII 161, 10-12; CSM I 114*: "Eadem dicuntur esse formaliter in idearum objectis, quando talia sunt in ipsis qualia illa percipimus".

[57] *Meditationes* III; AT VII 10; CSM II 26.

[58] For an introduction to the importance of this debate about similarity for 17th and early 18th century philosophy, with a particular attention to Foucher, is still worth reading Richard A. Watson, *The Downfall of Cartesianism: 1673-1712: A Study of the Epistemological Issues in late 17th Century Cartesianism* (The Hague: Nijhoff 1966).

set-up, since – so argued Descartes – it can be excluded that such a supremely perfect and hence benevolent being would have never decided to lead his creatures astray without any chance to realize they were and, accordingly, to amend (more on this in §9). Descartes' appeal to God to validate human cognition is arguably the most problematic aspect of his philosophy under quite a few regards: besides being philosophically unappealing, it remains unclear how Descartes intended to establish this conclusion. As well-known, the argument of the *Meditations* gives in fact rise to the so-called "Cartesian Circle", which is notoriously one of the most problematic – and apparently irresoluble – issues of Descartes' philosophy. As far as the topic of this work is concerned, what really matters is not however whether Descartes succeeded or not in finding a way out of this "Circle", but how far he took his "validation" of the mind's faculties to go. The reason why Descartes concluded that *innate intellectual ideas* depict their objects exactly as they are is indeed that, if this was not the case, no other power of the mind would have ever been in a position to rectify these faulty convictions, since according to Descartes all other cognitive faculties are in the end nothing but ensuing functional specification of the understanding.

The same reasoning does not however apply to sensibility. Descartes insisted that, contrary to what happens with the innate intellectual ideas of the understanding, it could not be *proven* – and even the less *taken for granted* (as in his mind Aristotelian had done) – that also the adventitious ideas of the senses represent their object *as is*. This work is intended to show that, at the same time, according to Descartes there also were no *a priori* arguments to conclude that sensory ideas *necessarily* depict the objects they are about *as other than they are*. According to Descartes, so argues this work, figuring out which one of the two options is the case falls in fact outside the purview of any theory of ideas and, more in general, of 'first philosophy'. "Perhaps" (*forte*): is this the final word of the *Meditations* concerning whether sensory ideas represent bodies as they are, or not:

> From the fact that I sense very different colors, sounds, smells, flavors, hot, hardness and the like, I am correct in inferring that in the bodies which are the source of these various sense-perceptions there are some corresponding, though *perhaps* non-similar, differences (*iis respondentes, etiamsi forte iis non similes*) … Although I feel heat when I go near a fire and feel pain when I go too near, there is no convincing argument for supposing that there is something in the fire similar (*aliquid simile*) to the heat, any more than for supposing that there is something similar to the pain. There is simply reason to suppose that there is something in the fire, whatever it may eventually turn out to be (*aliquid, quodcunque demum sit*), which produces in us the feelings of heat or pain.[59]

[59] *Meditationes* VI; AT 81, 17-22 & 83, 6-12; CSM II 56-57* (emphasis added).

If the innate ideas of the understanding permit therefore according to Descartes to establish that bodies have an extension and related features (such as figure and motion; more on this in §6), at the outset of the *Meditations* it remained on the other hand still to be determined whether Aristotelians had been right in ascribing to bodies also colors and similar sensible qualities on the basis of the *adventitious ideas of the senses*. But since according to Descartes it remained open to doubt whether sense-perceptions could be taken "at face value" to provide a transparent insight into the constitution of bodies, he concluded that sensory ideas had to be demoted to the class of the "obscure and confused perceptions", as opposed to the "clear and distinct ideas" of the understanding. Still, even in what is maybe the most virulent attack to the theoretical value of sensory ideas to be read in the *Meditations*, Descartes insisted that sense-perceptions represent and they do in fact represent the *essence* of the objects they are about, although given what has been said before he remarked once again that it would be an error

> to treat sense-perception as reliable touchstones for *immediately* discerning the essence of the bodies located outside us, that they represent only in a very obscure and confused way.[60]

The same point had been made in the *Second Meditation*, where Descartes famously argued that "the essence of this piece of wax (*quid sit hæc cera*) … is perceived by the mind alone" (*solâ mente percipere*). Descartes, however, also argued that such an "inspection of the mind alone" (*solius mentis inspectio*) is present also in sense-perception, for how much in this case the perception of the wax's essence could no longer be taken to be "clear and distinct" but proves "imperfect and confused" as a result of the embodiment of the cognitive power (for more on the logic of Descartes' way example, see §14).[61] If only intellectual ideas can in fact be taken to provide a crystal-clear and full insight into the essence of the object they are about, for Descartes also sensory – as well as imaginary – ideas do represent, and do represent the essence of the object they are ideas of. Only "obscurely and confusedly", though, that is to say, by leaving the perceiver in the dark whether the object they represent is indeed *as* they present it to be, or not.

In the light of the passages and the arguments just presented it seems to me therefore safe

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[60] *Ibid.* AT VII 83, 16-23; CSM II 57-58*: "sed video me in his aliisque permultis ordinem naturæ pervertere esse assuetum, quia nempe sensuum perceptionibus… utor tanquam regulis certis ad *immediate* dignoscendum quænam sit corporum extra nos positorum essentia, de qua tamen nihil valde obscure & confuse significant" (emphasis added). As argued by Alison Simmons, "Are Cartesian Sensations Representational?", *Noûs* 33 (1999), 362 and as it should come clear from §25, "signify" means in this passage the same as "represent". For a more articulated analysis of this passage, see also §12 and the conclusions to this work.

[61] *Meditationes* II; AT VII 31, 16-28; CSM II 21.

to conclude, that for Descartes sensory ideas too represent the essence of the object they are about.[62] Before concluding this introductory chapter, it is however to be insisted once again that the main argument presented in what follows only requires that sensory ideas *represent* the corresponding properties of bodies – by way of instance, the properties that gave rise to these color-ideas. The more contentious claim that sensory ideas too represent the body's essence is not indeed required to argue that, according to Descartes, whether these physical properties are exactly as sensory ideas present them to be (in this case, truly of a color, as it was the case for the *albedo* and the *rubedo* of Aristotelians) cannot be decided by simply inspecting our color-sensations, (although to my eyes this understanding of sensory ideas' intentionality permits to make better sense of Descartes' texts and of the logic of his argument). The ultimate goal of this work is not indeed to work out an exhaustive account of Descartes' theory of representation, but to show that Descartes took the philosophy presented in the *Meditations* to establish that bodies are extended substances, whereas he thought that it remained to be

[62] A variant of the objection mentioned above would indeed oppose that according to Descartes only *innate* ideas represent essences, possibly quoting on behalf of this reading a letter written by Descartes at the time of the *Meditations*; To Mersenne, 16 June 1641; AT III 383; K 183: "I use the word 'idea' to mean everything which can be in our thought, and I distinguish three kinds. some are adventitious, such as the idea we commonly have of the sun. Others are made, or factitious (*factæ vel factitiæ*), in which class we can put the idea which the astronomers construct of the sun by their reasoning. Others are innate, such as the idea of God, mind, body, triangle, and in general all those which represent true, immutable and eternal essences (*Essentias Veras, Immutabiles & Æternas repræsentant*)". As shown in the following section, Descartes' point in presenting this threefold distinction is not however to argue that innate ideas represent the object they are about any differently than factitious or adventitious ones, but only that, whereas the notion of a siren is of man's own making, this is not the case for the concept of a triangle and like notions, "which are not made by me, but have their own true and immutable natures (*non tamen a me finguntur, sed suas habent veras & immutabiles naturas*)"; *Meditationes* V; AT VII 64, 10-11; CSM II 44*. Accordingly, Descartes would refuse to qualify the siren's essence as "immutable and eternal", at least in the sense employed above, and reasonably so; cf. *Responsiones* I; AT VII 117, 9-12: "illas ideas, quæ non continent veras & immutabiles naturas, sed tantum fictitias & ab intellectu compositas". According to Descartes, on the other hand, the representational content of both adventitious and innate ideas is given to me, so that I cannot modify it at whim (see §1). As far as material objects are concerned, moreover, both adventitious and innate ideas present them as *extended*. Descartes, still, states only in the case of innate ideas that they "represent true, immutable and eternal essences" as he wants to insist that the notions of geometry are not acquired though abstraction from the senses (from adventitious ideas, namely) but are inborn notions (see §4 for a more detailed articulation of this claim). Accordingly, although extension is for Descartes both an adventitious idea of the senses (something than I am confronted with in seeing, for instance) and an innate idea of the understanding, only the understanding is able to realize that this idea represents a "true, immutable and eternal" essence: the subject matter of a science (the topic is addressed extensively in §6).

determined on different grounds whether bodies are in fact *nothing but* "extended things".

Before the second part of this work spells out and argue for this latter claim, one must however come clear about how Descartes intended to establish, by considering nothing but the ideas of material objects, that these objects not only exist, but are essentially extended, and shaped, and in motion or at rest in relation to each other. That they are, as Descartes famously put it, *res extensæ*, as he claimed to have established thanks to the *innate*, *intellectual*, and *clear and distinct* idea we happen to have of this extension. What Descartes exactly meant by distinguishing our mental representations into these classes and how he construed his argument in favor of this grand claim is the object of the enquiry of the first part of this work.

[§§1-4] Factitious, Innate, Adventitious Ideas

The section studies Descartes' distinction between factitious, innate and adventitious ideas, arguing that Descartes classified ideas into these three classes according to whether the subject is able to freely determine both the idea's place in the timeline of thoughts *and* its representative content, only the former, or neither of these (§1). It shows that this distinction informs the overall structure of the *Meditations* and is crucial for understanding Descartes' claim that the mind cannot but be aware of all its faculties, at least for the time their operations occur, as well as Descartes' argument for the existence of material objects (§2). It sets forth an alternative reading of Descartes' conception of innatism in light of the above-mentioned criteria (§3), and concludes by showing that Descartes' claim that "there is nothing in our ideas which is not innate to the mind", made in the 1648 *Notes on a Certain Broadsheet* against Regius, does not contradict the taxonomy worked out in the 1641 *Meditations* (§4).

§1. The grounds of the distinction

Just after having introduced the rudiments of his theory of ideas, Descartes first proposes (initially only as a tentative hypothesis) his famous distinction of ideas into three classes, according to their different origins:

> Among my ideas, some seem to be innate, some to be adventitious, and others to have been made by me myself (*a me ipso facta*). The fact that I understand what a substance is (*quòd intelligam quid sit res*), what truth is, what thought is, seems indeed to derive from nothing else but my own nature. While hitherto I have always judged that my hearing, right now, of a noise, my seeing the sun and feeling the fire, come from things located outside me. Lastly, sirens, hippogriffs and the like are made by me. But perhaps all my ideas might be thought of as adventitious, or innate, or as made (*factas*). For, as yet, I have not clearly inquired into their true origin.[1]

Both the terms and the concepts were not new, as is immediately obvious for "innate". "Adventitious" had already been contrasted with *nativus* by Bacon in his classification of the "Idols of the mind".[2] *Nativus*, moreover (which is the same as "innate") had been opposed to "factitious" since at least the 12th century, especially in some theological discussion that could have inspired, at least indirectly, Descartes, who refers to this class of ideas also as the ideas "made" by the subject (as in the passage just quoted) and, at least in one occasion, as the "fictitious" ones.[3] The triad factitious (or synonyms), innate and adventitious seems yet to be truly Descartes'.[4]

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[1] *Meditationes* III; AT VII 37, 29 - 38, 10; CSM II 26*.

[2] Cf. Francis Bacon, *De Dignitate et Augmentis Scientiarum* (1623) V 4: "Doctrinam, quam Elenchos Magnos, sive de Idolis animi humani nativis et adventitiis appellabimus"; cf. *The Works of Francis Bacon*, ed. James Spedding *et alii* (London: Spottiswoode 1857-74), I 646. In the same work (II 2) Bacon recommends the "Naturæ Historiam Subactæ et Factitiæ, quam Mechanicam appellare solemus" but here the meaning is clearly not Descartes'.

[3] *Annotationes quas videtur D. des Cartes in sua* Principia Philosophiæ *scripsisse*; AT XI 655: "factis sive fictitiis". See for example Bernard of Clairvaux, *Sermones super Cantica Canticorum*: "Non est itaque quod unitas, qua unum sunt Pater et Filius, dicatur fieri de naturis vel essentiis vel voluntatibus, quæ non sunt; non est quod dicatur vel fieri, quia est. Non enim factitia est, sed nativa". In *Sancti Bernardi opera* eds. Jean Leclercq – Charles Talbot – Henri Rochais (Romæ: Ed. Cistercienses 1957-77), II 219. Contrasted with "naturalis" in *Ibid.* III 255.

[4] Some caution is in order. Indeed, to the best of my knowledge no serious attempt has been made to reconstruct the sources of Descartes' distinction. Analogously, no Cartesian dictionary has specific entries for "adventitious" and "factitious". The brand-new *Cambridge Descartes Lexicon* edited by Lawrence Nolan (New York, NY: Cambridge University Press 2016) makes a partial exception but, even here, the entries "adventitious" and "factitious" simply redirect the reader to the entry "idea" which, in turn, limits itself to quote AT VII 37, 29 - 38, 10. Also Rudolph

At least at first glance, it seems that Descartes presents the distinction between these three classes of ideas as primitive rather than as derivable from a single principle, and this is indeed how the theory is usually construed by the literature. Besides being quite unappealing from a theoretical point of view (since too many elaborated notions would thereby be simply *assumed* as primitive), this reading raises right away the question of whether this taxonomy is truly exhaustive. The question is pressing, since Descartes relies on arguments by exclusion in quite a few crucial steps of his reasoning, firstly in order to prove that the idea of God cannot but be innate inasmuch as is neither factious nor adventitious. A deduction of this distinction – especially if entailing a proof of its completeness – would therefore substantially enhance Descartes' argumentation.

In this section, I argue that the *Meditations* do actually provide such a deduction, although in a quite unexpected way: to draw the distinction between factitious, innate, and adventitious idea is a phenomenological investigation into the interplay between the willing and the perceiving faculty (the intellect in the broad sense of the term) as far as the ideas' order of occurrence in the timeline of thoughts and their representative contents are concerned. These two faculties, according to Descartes, are to be distinguished "as the action and the passion of one and the same substance" – the *res cogitans*, of course (more on this below).[5] Nor are the two above-mentioned factors picked up randomly, but rather derive from the twofold point of view in terms of which *any* idea can be considered: that is to say, either as a state of the mind or, alternatively, as the representation of something, which Descartes refers to as, respectively, the *formal* and the *objective* reality of an idea.[6] For Descartes the mind is, in fact, always thinking, so that ideas (in the *formal* sense of the term) uninterruptedly follow one another in consciousness. These ideas, in turn, are always ideas *of* something – "of a man, for example, or of a chimera, or the sky, or an angel, or of God", an aspect of the matter to which Descartes alludes in speaking of the *objective reality* of the idea – in other words, its representational content. Given these two factors (the representational content of an idea and its place in the timeline of thoughts), I argue that Descartes classifies all ideas into three groups according to whether, with regard to a certain idea, the subject is able to alter at will (*ad arbitrium*) both of the two aspects just specified, only the latter of the two, or neither.[7] Descartes, that is to say, distinguishes between

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Goclenius' *Lexicon philosophicum* (Frankfurt: Becker 1613) has no specific entries on these terms.

[5] To Regius, May 1641; AT III 372, 9-13; K 182*.

[6] Cf. *Meditationes* III; AT VII 40, 5 - 41, 29.

[7] The expression "ad arbitrium" is to be found in *Meditationes* V; AT VII 64, 6-11.

(i) a class of ideas whose representational content *and* occurrence can be modified at will;

(ii) a class of ideas whose objects are given whereas their occurrence in consciousness is still to be freely determined by the subject;

(iii) a residual class of ideas which impose themselves thoroughly and entirely on the subject, and concerning which the subject cannot decide either which one of them will occur to him at any given time.

Twofold reality of ideas

Formal reality	Objective reality	
↓	↓	
Occurrence in the timeline of thoughts	*Representational content*	*Inferred origin*
Freely determined by the subject	Freely determined by the subject	→ Made by the mind (factitious)
Freely determined by the subject	Given	→ Inborn in the mind (innate)
Given	Given	→ From outside the mind (adventitious)

This threefold distinction of ideas is, therefore, logically exhaustive.[8] Descartes, as a consequence, is entitled to reason by exclusion: any idea must be either factitious, innate or adventitious. Accordingly, an idea that has proven not to fall into two of these categories is to be safely ascribed to the remaining one.

In order to validate what has, as yet, been introduced only as a working hypothesis, I show that Descartes is still required to prove two additional claims, namely, (1) that none of these

[8] Taken by itself, this scheme would imply a *fourth* class of ideas, whose representative content would have to be freely determined by the subject whereas their order in thought would be given. For Descartes, however, if the subject is capable of modifying the representational content of an idea he must also be able to cause this idea to occur whenever he prefers, as Descartes takes the former to be a far more difficult task than the latter. Indeed, if the subject can modify an idea however he prefers, he can also turn it into the idea of something else, by making the former idea disappear: he can, that is, stop thinking about it. By the same token, however, he can also bring it about. Therefore, Descartes' taxonomy of ideas consists of only *three* classes.

classes is empty, *viz.* that there are in fact ideas whose object and occurrence are both freely decided by the subject and similarly for the remaining classes. This point, according to Descartes, is to be settled by introspection. Descartes, however, also wanted to argue that (2) from these *phenomenological features* one can *infer* where these ideas come from, i.e. their *origin* – this, in turn, being a metaphysical claim about the different causes of these different classes of ideas.

The doubts raised in the *First Meditation* required in fact Descartes to take as the starting point of his enquiry nothing but the mind and its ideas, studied from the first-person perspective through introspection, and in this sense his approach can be qualified as phenomenological. Descartes' chief concern in advancing the distinction between factitious, innate and adventitious ideas was not yet to investigate the interplay of willing and understanding for its own sake, but to supply the ultimate ground for proving the existence of God *and* of the outside world – two very strong existential claims, if any. The *Discourse on the Method* (1637), which still lacked the notion of adventitious (as well as of factitious) ideas, offered indeed no argument for the existence of material objects.[9] It cannot therefore be maintained that the distinction between factitious, innate and adventitious ideas "n'a sens que par rapport à la preuve de l'existence de Dieu".[10] Gilson himself had indeed pointed out elsewhere (also thanks to an instructive comparison with Spinoza's own version of the argument) that Descartes' proof for the existence of external objects is grounded on the involuntary character of adventitious ideas, without however noticing that Descartes had appealed to the will also in order to characterize factitious and innate ideas.[11]

Descartes' distinction between factitious, innate and adventitious ideas cannot indeed be regarded as a piece of doctrine among the many, a distinction (as argued by Alquié) "un instant évoquée" and "aussitôt abandonnée" by the line of reasoning of the *Meditations*.[12] As shown in what follows, the demonstration that this distinction is the case informs in fact the overall structure of the work. More specifically, the *Third* and *Fifth Meditation* are devoted to proving that the ideas of God and of mathematical objects have a given content but a freely-determined

[9] Cf. *Meditationes*, *Præfatio*; AT VII 7, 20 - 8, 15. In the *Discours* Descartes only *states* that, to demonstrate that the external world exists, one must already have proven that this is the case for God. No proof of this claim – nor of the former point – is offered, though; cf. *Discours* IV; AT VI 37, 24 - 38, 15.

[10] Étienne Gilson ed., *Discours de la méthode: Texte et commentaire* (Paris, 1947), 327.

[11] Id., *Études sur le rôle de la pensée médiévale dans la formation du système cartésien* (Paris: Vrin 1930), 299-315. Spinoza's reworking of Descartes' argument can be read at *Principia philosophiæ cartesianæ* I 21.

[12] Ferdinand Alquié, *La découverte metaphysique de l'homme chez Descartes* (Paris: Presses Universitaires de France 1966^2), 204.

occurrence in the timeline of thoughts, from which Descartes concludes that they must be inborn in the mind. This discovery, moreover, enables him to reconsider in a new light the results of the *Second Meditation* and to argue that the idea of the "I" too has necessarily to fall into the same category. The *Sixth Meditation*, for its part, singles out adventitious ideas as its main topic of investigation. A demonstration, however, that the ideas whose representational content *and* occurrence are freely determined by the subject are indeed created by the subject himself is nowhere to be found in the entire work. Such a lacuna, which would appear to undermine completely Descartes' reasoning, proves yet to reveal how this was supposed to work.

§2. Unknown faculties and the transparency of the will

A seemingly insignificant flaw in Descartes' wording when introducing the distinction between factitious, innate and adventitious ideas already revealed the highly peculiar status of the first class. While Descartes, insisting on the hypothetical status of his newly-advanced taxonomy of ideas, proceeds very cautiously in claiming that some of them "*seem* to derive from my own nature", and that "I have hitherto always *judged*" that others among these ideas come from things located outside me (a judgment that might well prove to be unwarranted), he eventually throws aside all caution by assertively affirming that "sirens, hippogriffs and the like *are* made by me". Even though Descartes hastens to remark that all ideas could turn out to be innate, or adventitious, the course of the *Meditations* makes it clear that he never actually considered this possibility to be a real one. In a work pervaded by all sorts of doubts, Descartes simply took for granted that there are such things as factitious ideas.

In point of fact, Descartes' real concern in the *Meditations* is not that the ideas whose object and occurrence in the timeline of thoughts are freely determined by the subject himself could turn out not to be created by this latter (the inference appears, in fact, quite hard to resist). What really worries him is the opposite scenario, namely, that the allegedly innate and adventitious ideas might eventually prove to be factitious; that they might prove to be arbitrary stipulations (as some of his opponents claimed regarding the concept of a "supreme being"), pure fictions conjured up by crafty politicians or some sort of unintended by-products of the soul, as was usually taken to be the case for dreams.[1] As for the former, in particular, it has to be demonstrated that the unity of the conceptual marks of this notion – as of all ideas aspiring to the denomination: "innate" – is *given* rather than "made up at will by the mind" (*ad arbitrium mentis effictis*) as Descartes took for example to be the case "for the confused ideas of gods of the idolaters".[2] Descartes, in the *Meditations*, is thus in search of some idea whose content (if

[1] The allegation that founders of religions were nothing but *imposteurs* was without doubt known to Descartes; see René Pintard, *Le Libertinage érudit dans la première moitié du XVIIe siècle: La Mothe le Vayer, Gassendi, Guy Patin* (Paris: Bovin 1943).

[2] *Responsiones* IV; AT VII 234, 1-2; CSM II 163. Cf. To Clerselier, 23 April 1649; AT V 354; K 376. "My purpose was to base a proof of the existence of God on the idea or thought which we have of him, and so I thought that I was obliged first of all to distinguish all our thoughts into certain classes, so as to observe which are those that can deceive. By showing that not even chimeras contain falsehood in themselves, I hoped to forestall those who might reject my reasoning on the grounds that our idea of God belongs to the class of chimeras. I was also obliged to distinguish the ideas which are born with us from those which come from elsewhere, or are made by us, in order to forestall those who might say that the idea of God is made by us or acquired by hearing others speak of him".

not both its content and occurrence) could not be modified, at a whim, by the meditating subject and in the face of which his freedom in figuring out things such as "sirens, hippogriffs, and the like" by combining different pieces of knowledge would eventually find its limit. In order to prove that God and the external world exist, Descartes had thus to demonstrate, first of all, that the subject does not bring about these ideas by himself or, to come back to the terms of art just introduced, that these ideas are not factitious, that they are not *chimères*.

Descartes' unstated assumption according to which all ideas whose occurrence and content are freely determined by the subject are indeed factitious follows from a much more controversial thesis that the *Meditations* take for granted right from the outset: namely, that the (meditating) subject is free. For Descartes, in fact, the subject comes to discover that his own existence cannot be called into question – at least as long as he is thinking – by simply "using his freedom" to doubt of everything.[3] The free will is indeed, according to Descartes, one of the "primary notions", that is notions that he thinks one does not need to be prove.[4] Actually, being the basic items of any possible demonstration, for Descartes like notions simply *cannot* be proven. Consistently, in all his works Descartes simply *asserts* that "we have free will",[5] as we experience any time that we withhold our assent in doubtful matters or, even more relevantly, as we give it to clearly perceived truths. Descartes' disdainful reaction to Gassendi' criticism on this issue is especially telling:

> As for the indifference of the will, even though what you deny is evident by itself, I really have no wish to set about proving it for you. In matter of this sort everyone must experience things by himself, rather than waiting to be convinced by some reasoning. But you, poor Flesh, apparently do not mind the mind's own actions (*ad ea quæ mens intra se agit, non videris attendere*). Be unfree, if you do not like to be free. As for myself I will rejoice in my freedom, since I experience it within myself.[6]

Descartes, indeed, adopted such a purely first-person approach even as it had come to *define* the concept of free will:

[3] *Meditationes*, *Synopsis*; AT VII 12, 10-13: "mens quæ, propriâ libertate utens…".

[4] Cf. To Mersenne, December 1640; AT III 259; CSM III 161: "You are right to say that we are as sure of our free will as of any other primary notion (*notion première*), for this is certainly one of them".

[5] *Principia* I 6; AT VIII-1 6, 25-30. See also *Responsiones* II; AT VII 166, 3-7.

[6] *Responsiones* V; AT VII 377, 17-24; CSM II 259*.

> The will, or freedom of choice… consists simply in the fact that we do not feel to be determined by any external force to affirm or deny (*a nullâ vi externâ nos ad id determinari sentimus*) what the intellect puts forward for affirmation or denial.[7]

The difficulties of such a purely epistemological and almost psychologistic definition of the will, as well as of the equation between *voluntas* and *arbitrii libertas*, are simply too complex to be addressed here. It must be noted, however, that the inner testimony of consciousness is said to be able, by itself, to decide on all matters where the will is concerned; even more: these issues, by Descartes' definition of free will, could not possibly be settled otherwise. Therefore, in the case where the subject experiences no external pressure in resolving to bring about, at a given moment in time, such and such an idea (for example, in his decision to come up, right now, with a creature as strange as possible), this idea – the idea of, say, a hippogriff – is to be regarded as truly created by him, i.e. as factitious, and this ascription could never be proven wrong. Therefore, in the case where the subject experiences himself as the cause of the coming into being of an idea (as regards both its occurrence in the timeline of thoughts and its content), he is indeed the true cause of this idea.

According to Descartes "made by the subject" (the defining feature of factitious ideas) means, more specifically, "made by the will". From the *Meditations* onward he identifies, in fact, the understanding with the passive side of the mind – i.e. with the mind *qua* passive – all its activities being attributed to the will, arguing that "it is a passion in the soul to receive one or other idea, and only its volitions are activities".[8] The making of an idea counts, of course, among

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[7] *Meditationes* IV; AT VII 56, 28 - 57, 27; CSM II 39-40. Cf. *Excerpta* (Cartesius), AT XI 648. In a quite problematic text Descartes argues that the subject can attest his freedom by refusing his assent to a clearly and distinctly perceived idea; cf. To Mesland, 9 February 1645; AT IV 173, 20-23; K 245: "For it is always open to us to hold back from pursuing a clearly known good, or from admitting a clearly perceived truth, provided we consider it a good thing to demonstrate (*testari*) the freedom of our will by so doing". In the *Meditations*, however, there seems to be no evidence of this argument. Nor in the *Principles*. See nonetheless, recently, Omri Boehm, "Freedom and the Cogito", *British Journal for the History of Philosophy* 22/4 (2014): 704-24. Of a demonstration of the subject's freedom speaks also Stephen J. Wagner, *Squaring the Circle in Descartes'* Meditations: *The Strong Validation of Reason* (Cambridge: Cambridge University Press 2014).

[8] To Mesland, 2 May 1644; AT IV 113; K 232*. See the above-mentioned letter To Regius, May 1641; AT III 372, 9-13; K 182: "Where you say "Willing and understanding differ only as different ways of acting in regard to different objects", I would prefer "They differ only as the activity and passivity of one and the same substance". For strictly speaking, understanding is the passivity of the mind and willing is its activity (*intellectio enim propriè mentis passio est, & volitio eius actio*)". To Regius, December 1641; AT III 454-55. As profusely attested by the *Fourth*, this theory is already at work in the *Meditations*, published just a few months after the first letter to Regius. The opposition

these, and Descartes is indeed explicit in claiming that "an action of the will contributes to fictitious ideas"[9] and that ideas of this sort "proceed from a resolution of the will".[10] Perceiving the idea so made is, on the other hand, a matter for the understanding. The understanding, however, does not only perceive the outcome of this voluntary act but also the very act that brought that idea into being. As soon as the mind wants something, it is in fact aware, simply because of that, of its striving, and necessarily so, since for Descartes all mental events are accompanied by consciousness:[11]

> The perceptions that have the soul as their cause are the perceptions of our volitions and of all the imaginings or other thoughts which depend on them. For it is certain that we cannot will anything without thereby perceiving that we are willing it (*Car il est certain que nous ne saurions vouloir aucune chose que nous n'apercevions par mesme moyen que nous la voulons*). And although willing something is an action with respect to our soul, the perception of such willing may be said a passion in the soul. But this perception is really one and the same thing as the volition.[12]

Thus far, Descartes could have been taken merely to be claiming that whatever the subject experiences as made by himself has actually been made by said subject; i.e. all purportedly factitious ideas are indeed factitious. But as the passage just quoted attests, Descartes wants further to argue for a much stronger claim, *viz.* that the subject must be cognizant of *all* his

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between an active will and a passive understanding will be almost the starting point of Descartes' last treatise; see *Passions* I 17; AT XI 342, 6-22. In the *Rules* (AT X 415, 23-24), on the other hand, Descartes argued that the *vis cognoscens* is both active and passive and, accordingly, credited the faculty to judge to the understanding (*Regulæ* XII; AT X 420, 16-18) but this theory was abandoned in the later works – with the possible exception of the *Discourse*, which is not clear about the issue.

[9] *Annotationes quas videtur D. des Cartes in sua* Principia Philosophiæ *scripsisse*; AT XI 655: "ad fictitias voluntatis actio concurrat" (my translation).

[10] *Notæ in Programma*; AT VIII-2 358, 2-3: "a voluntatis meæ determinatione procedebant".

[11] For a more nuanced presentation of this point, see Alison Simmons, "Cartesian Consciousness Reconsidered", *Philosophers' Imprint* 12/2 (2012): 1-21. As already pointed out in §0, in recent years there has been quite a debate on whether Descartes took consciousness to be the *essential feature* of the mind or only as a sort of *marker* of the mental, as opposed to the corporeal – the essence of the mind having to be found in intentionality, say, or in representation – a view defended for example by John Carriero, *Between Two Worlds: A Reading of Descartes's* Meditations (Princeton, NJ: Princeton University Press 2009), 24-25 and *passim* and by Gary Hatfield, "Transparency of Mind: The Contributions of Descartes, Leibniz, and Berkeley to the Genesis of the Modern Subject", in Hubertus Busche ed., *Departure for Modern Europa: A Handbook of Early Modern Philosophy, 1400-1700* (Hamburg: Meiner 2011), 361-75. For the argument of this chapter, the latter, weaker claim suffices.

[12] *Passions* I 19; AT XI 343; CSM I 335-36 (emphasis added).

actions, since otherwise they could not possibly be said to belong to him, to be his own. This would entail, among other things, that if the subject experiences that the representational content and occurrence of an idea are *given* (as opposed to freely-determined by himself) then this must indeed truly be the case, without any possible room for error. Therefore, Descartes' grand claim about the transparency of the mind and, consequently, of the will – i.e. of the mind *qua* active – rules out the possibility that the subject can perform any action without being aware that he wants to perform it. Geulincx's famous principle that "it is impossible to bring about something when one does not know how it is brought about…you are not the cause of that which you do not know how to bring about (*impossibile est, ut is faciat, qui nescit quomodo fiat… quod nescis quomodo fiat, id non facis*)" is indeed nothing but an extreme version of this Cartesian claim.[13]

Descartes was fully aware that this thesis flew in the face of received opinion: the claim is admittedly problematic under quite a few regards, and has accordingly received much criticism from later philosophers. He noted that the subject is, in fact, usually believed to be himself the maker of his own dreams, although the will seems to have no control over this stream of images. Therefore, just as the faculty of the imagination fabricates the realm of dreams, some other faculty might well be dreaming up the everyday world without the will's taking any part in this process (or at least, this would be so according to the testimony provided by consciousness). Were this the case, then, all adventitious ideas would eventually turn out to be factitious:

> Although those ideas do not depend on my will, it does not follow that they must come from things located outside me. Just as natural impulses... seem opposed to my will even though they are within me, so there may be some other faculty not yet fully known to me, that produces these ideas (*facultas, nondum mihi satis cognita, istarum idearum effectrix)*. This is, after all, just how I have always thought ideas are formed in me, without any assistance from external things, when I am dreaming.[14]

Natural impulses (*impetus naturales*) too call into question Descartes' claim, since they too seem to depend on some latent faculty that escapes the control of the subject – or, to recast the point in simpler terms, on an unconscious. It is the subject's experience, in fact, that the resolutions which he freely and rationally forms are sometimes opposed and hindered by some impulses which he experiences in himself as possible causes of his actions, despite him being unwilling to comply with their biddings. Therefore, even if it were to prove true that

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[13] Arnold Geulincx, *Metaphysica vera* in *Arnoldi Geulincx antverpiensis Opera philosophica*, ed. Jan Pieter N. Land (The Hague: Martinum Nijhoff 1893), II 150-51.

[14] *Meditationes* III; AT VII 39, 6-14; CSM II 27*.

adventitious ideas do not depend upon the will, this would not rule out, just in itself, the possibility that these ideas are not produced by the subject, since dreams and natural impulses do not depend upon the subject's will either, apparently, and yet they exist and must be accounted for. Aristotelians, accordingly, posit a "lower part of the soul", a "sensitive" part, that is responsible for these latter.

The hypothesis of a *facultas nondum cognita*, understood as a faculty of the mind that escapes consciousness but still affects it, does not just challenge Descartes' threefold distinction of ideas, though, but his entire philosophy of mind. By taking consciousness as the mark of the mental, Descartes was in fact denying the very possibility of an unconscious in the sense ascribed to this notion by Leibniz, for example (not to drag in Freud) – *viz.* as a power of the mind that, even if activated, keeps on eluding introspection. Furthermore, by construing sensibility, imagination and the intellect as different *functions* of one *vis cognoscens* (as *modi* of one substance, the *res cogitans*), Descartes was also opposing Aristotelian psychology, according to which the sensitive soul can subsist without the rational one, as was taken to be the case for non-rational animals[15] But since for Descartes the mind is fully conscious of everything that occurs within it, and even more of all the actions that it decides to perform, it follows that he cannot credit it with bringing about something involuntary, such as dreams and natural impulses. Therefore, dreams and natural impulses must have been brought about by the only other substance admitted by Descartes' metaphysics: the *res extensa* – the body (the reasons why Descartes excluded God – the infinite substance – as a candidate is discussed in the next pages). Descartes intended, in fact, to prove that the cause of dreams, impulses and all non-voluntary psychological phenomena is neither "the lower part of the soul" of the Aristotelians, nor something like Freud's *id*, but the body alone:

> All the conflicts usually supposed to occur between the lower part of the soul, which we call 'sensitive', and its higher or 'rational' part – or between natural appetites and the will – consist simply in the opposition between the movements which the body (by means of its spirits) and the soul (by means of its will) tend to produce at the same time in the gland. For there is within us but one soul, and this soul has within it no diversity of parts: it is at once sensitive and rational too, and *all its appetites are volitions*. It is an error to identify the different functions of the soul with persons who play different, usually mutually opposed roles – an error that arises simply from our failure to distinguish properly the functions of the

[15] Cf. *Regulæ* XII; AT X 415, 13 - 416, 16. *Meditationes* III; AT VII 34, 18 - 35, 2. See below §5.

soul from those of the *body. It is in fact to the body alone that we should attribute everything that can be observed in us to oppose our reason* (*auquel seul on doit attribuer tout ce qui peut estre remarqué en nous qui répugne à nostre raison*).[16]

In order to establish these all-important claims, Descartes must therefore fend off once and for all the menace that consists in the notion of some unknown faculty of the mind bringing about those ideas whose representative content and whose occurrence in the timeline of thoughts are not freely determined by the subject but are rather passively given to him. Descartes began his investigation of these phenomenological features already in and through the very act of introducing the distinction between factitious, innate and adventitious ideas. As far as the third class is concerned, he noted, in fact, that "hitherto I have always judged that my hearing, *right now* (*nunc*), of a noise, my seeing the sun and feeling the fire, come from things located outside me". A few lines later Descartes expands upon this remark about how allegedly adventitious ideas present themselves, by insisting on their "out of the blue" character and, as the argument goes, kindred temporal remarks increase more and more in number, and begin gradually to be associated with the impression that the subject encounters these ideas independently of his will:

I know by experience that these ideas do not depend on my will, and hence that they do not depend simply on me. Indeed, they frequently occur even if I do not want them to. For example, in this moment I feel the heat whether I want to or not (*ut jam, sive velim, sive nolim*), and this is why I think that this sensation, or idea, of heat comes to me from something other than myself – namely, from the heat of the fire by which I am sitting.[17]

As the passage makes clear, Descartes intends to derive the thesis that ideas of this kind originate from outside the mind – rather than from an unknown faculty of the mind itself – precisely from the fact of the outright passivity of the subject confronted by them. Indeed, Descartes intended to prove the existence of material things

[16] *Passions* I 47; AT XI 364, 17 - 365, 4; CSM I 345-46*. Cf. *Responsiones* IV; AT VII 1-11. *Meditationes* VI; AT VII 84, 19-25; CSM II 58*: "Even if there were no mind in the body insofar as is nothing but a machine, the body would still perform the same movements as it now does in those cases where movements are not under the control of the will or, consequently, of the mind (*hominis corpus, quatenus machinamentum quòddam... etiamsi nulla in eo mens existeret, eosdem tamen haberet omnes motus qui nunc in eo non ab imperio voluntatis nec proinde a mente procedunt*)".

[17] *Meditationes* III; AT VII 38, 11-22; CSM II 26*.

> not from the fact that we have ideas of them, but from the fact that these ideas come to us in such a way as to make us aware that they are not produced by ourselves, but come from elsewhere (*nobis sic adveniant, ut simus conscii, non a nobis fieri, sed aliunde advenire*).[18]

Since these ideas occur (*adveniunt*) to the mind independently of its will, they must come from (*advenire*) outside the mind. Hence their name.

> For my experience... the ideas of the qualities perceived through the senses come to me without my consent (*absque ullo meo consensu mihi advenire*), so that I could not have sensory awareness of any object, even if I wanted to, unless it was present to my sense organs; and I could not avoid having sensory awareness of it when it was present.[19]

It is fundamental to note that, right from the beginning, Descartes directs his attention away from the *general* class of ideas whose representational content and occurrence are given toward one sub-set of these latter, constituted by the ideas of sensible qualities, as attested by the passage just quoted.[20] This shift in scope can be easily explained if one bears in mind that one

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[18] To Hyperaspistes, August 1641; AT III 428-29; K 193.

[19] *Meditationes* VI; AT VII 75, 10-14; CSM 52. Cf. *Principia* II 1; AT VIII-1 40, 9-14.

[20] Descartes was yet fully aware that not all ideas whose content and occurrence in the timeline of thoughts are given can be said to be ideas of some sensible qualities, the natural impulses mentioned above standing out as a clear counter-example, together with the "habitual opinions that keep coming back... against my wishes" (*fere etiam me invito*); cf. *Meditationes* I; AT VII 22; CSM II 15*. Moreover, and perhaps even more relevantly, Descartes himself acknowledges that the subject is able to modify at least to a certain extent the course of his sensory experience by moving his sense organs; cf. *Regulæ* XII; AT X 412. Or, more precisely, since the existence of such a body – indeed of *any* body – has at this point in his argument not yet been proven, by bringing about a change in the ideas that are normally taken to represent states of his own body, of his limbs. Consequently, the content and occurrence of sensory ideas are *often*, but not always, given; see the just quoted *Meditationes* III, AT VII 38. See also AT VII 51. AT VII 79. *Passions* I 17; AT XI 342. Descartes' claim, actually, seems to demand an even stronger qualification. As shown in §27, in the *Meditations* Descartes argues in fact that, contrary to what happens for the ideas of the so-called *proper* sensibles (colors, sounds and the like), the perception of *common* sensibles – together with distance and location – is the result of a reasoning which, in turn, elicits a perceptual *judgment* (to be credited to the willing faculty). Therefore, whereas the perception of color (Descartes' "second degree" of sense perception) seems to require no action on the mind's part, this does not seem to be the case for the perception of shape (comprised in the *third* degree of the process); cf. *Responsiones* VI; AT VII 436-39. *Homme*, AT XI 159. On the topic, see Gary Hatfield, "Activity and Passivity in Theories of Perception: Descartes and Kant" in José Filipe Silva – Mikko Yrjönsuuri eds., *Active Perception in the History of Philosophy: From Plato to Modern Philosophy* (Dordrecht: Springer 2014), 275-89. This all being said, and all difficulties involved in it aside, Descartes can still claim that, as a matter of fact, there are indeed cases, and very common cases, in which neither the point of occurrence in the timeline of thoughts

of Descartes' intended goals in advancing the distinction between factitious, innate and adventitious ideas was to demonstrate the existence of the material objects. It was most probably to solve this specific problem that Descartes kept on investigating the (alleged) ideas of sensible objects until he thought he succeeded in singling out a phenomenological feature relevant for his metaphysical argument. He thought he found it in the fact that the representative content and occurrence in the timeline of thoughts of this class of ideas – sensory ideas – are *given*, contrary to what happens for other notions. It is possible that Descartes took his cue from Aristotle, actually, who had already remarked (although in a completely different context and to draw some completely different conclusions), that "it is open to use to think whenever we want, but perceiving is not similarly open to us, for the object of perception must be present".[21]

By simply reflecting on the concepts of act and potency, Descartes argues that this passive faculty of the subject to be affected by ideas that occur independently of his consent, whenever and however this may come to pass, must be triggered by some genuinely active power:

> There is in me a passive faculty of sensory perception, that is, a faculty for receiving and perceiving the ideas of sensible objects. But I could not make use of it unless there was also an active faculty, either in me or in something else, which produces or makes these ideas (*activa facultas istas ideas producendi vel efficiendi*). But this faculty cannot be in me <insofar as I am nothing but a thinking thing> since clearly it presupposes no intellection (*quia nullam plane intellectionem præsupponit*), and the ideas in question are produced without my cooperation and often even against my will (*& me non cooperante, sed sæpe etiam invito, ideæ istæ producuntur*). So the only alternative is that this active faculty is in another substance distinct from me – a substance which contains either formally or eminently all the reality which exists objectively in the ideas produced by this faculty… This substance is either the body, that is, the corporeal nature, in which is formally contained everything that is objectively in the ideas. Or else it is God, or some creatures more noble than the body, which contains it eminently.[22]

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nor the representative content of the ideas of sensible qualities (properly qualified) can be freely determined by the subject.

[21] Cf. *De Anima* B 5, 417^{b}24-26 (my translation).

[22] *Meditationes* VI; AT VII 79, 6-22; CSM II 55. The qualification in angle brackets is taken from the 1647 French translation of the *Meditationes*; cf. AT IX-1 63. Given its importance it cannot be but Descartes'. However, as it will immediately be shown, the clause does not reflect a change in Descartes' views, but aims only to elucidate the argument. For a very insightful analysis of Descartes' argument (although partially crippled by not considering the just-mentioned clause), see Lew Newman, "Descartes on Unknown Faculties and Our Knowledge of the External World", *The Philosophical Review* 103 (1994): 489-531.

Introspection, according to Descartes, is thus enough to refute the possibility of an unknown faculty insofar as the subject is regarded to be nothing but a thinking thing (or, more precisely, insofar as he regards himself in this way).[23] Descartes already made a similar claim in the *Third Meditation* (the same *Meditation* in which the bogeyman of a "faculty not yet fully known" first showed up), arguing that the subject cannot have the power to "sustain himself into being" because he has no experience of it. At least, not insofar as haspectuae is taken to be nothing but a thinking thing:

> I must therefore now ask myself whether I possess some power enabling me to bring it about that I who now exist will still exist a little while from now. For since I am nothing but a thinking thing – *or, at least, since I am now concerned only and precisely with that part of me which is a thinking thing* – if there were such a power (*vis*) in me, I should undoubtedly be aware of it. But I experience no such power, and this very fact makes me recognize most clearly that I depend on some being distinct from myself.[24]

What the *Sixth Meditation* is at pain to prove, however, is precisely that the subject *is* indeed nothing but a thinking thing and that, accordingly, conceiving of the mind independently of the body (as Descartes has been doing throughout the work) was not an arbitrary abstraction.[25]

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[23] Cf. *Responsiones* I; AT VII 107; CSM II 77: "In inquiring about what caused me, I was thinking about myself, not in so far as I consist of mind and body, but *only and precisely in so far as I am a thinking thing*. This point is, I think, of considerable relevance. For such a procedure made it much easier for me to free myself from my preconceived opinions, to attend to the light of nature, to ask myself questions, and to affirm with certainty that *there can be nothing within me of which I am not in some way aware*" (emphases added); cf. To Mersenne, 31 December 1640; AT III 273.

[24] *Meditationes* III; AT VII 49, 12-20; CSM II 34-35 (emphasis added). It is important to notice that the hypothesis of an unknown faculty discussed in the *Third Meditation* does not however undermine Descartes' proof of the existence of God, since this faculty – albeit unknown – would still be the faculty of a *finite* being (were I infinite, Descartes argues, I would not have all imperfections I experience to be in myself; cf. AT VII 45, 30 - 47, 23). Therefore, even such a faculty could not bring about the idea of infinity, which possesses a higher degree of reality, and this is what Descartes' proof of God's existence is all about. The issue has been much debated after David F. Norton, "Descartes on Unknown Faculties: An Essential Inconsistency", *Journal of the History of Philosophy* 6/3 (1968): 245-56. Cf. Leonard E. Brewster, "How to Know Enough About the Unknown Faculty", *Ibid.* 12/3 (1974): 366-71; Ted Humphrey, "How Descartes Avoids the Hidden Faculties Trap", *Ibid.*: 371-77. David F. Norton, "Descartes' Inconsistency: A Reply", *Ibid.* 12/3 (1974): 509-20. John C. Stevens, "Unknown Faculties and Descartes's First Proof of the Existence of God", *Ibid.* 16/3 (1978): 344-38. David F. Norton, "A Reply to Professor Stevens", *Ibid.*: 338-41. But see already Geneviève Lewis, *Le problème de l'inconscient et le cartésianisme* (Paris: Presses Universitaires de France 1950), 62-63.

[25] Cf. To Mesland, 2 May 1644; AT IV 120; K 236: "There is a great difference between abstraction and exclusion. If I said simply that the idea which I have of my soul does not represent it to me as being dependent on the body and identified with it, this would be merely an abstraction, from which I could form only a negative argument

After the *Fifth Meditation*, devoted to the *essence* of material things (which has proven to be extension), Descartes thinks he has yet finally demonstrated that the *notions* of mind and body are distinct. Moreover, since these two notions have been rigorously established (or, in Descartes' jargon, since they are "clear and distinct"), mind and body *can* both exist, and exist independently of each other. The *cogito* argument, as a matter of fact, has already established that the mind exists. Therefore, "I can infer correctly that my essence consists solely in the fact that I am a thinking thing".[26] And since the faculty of bringing about adventitious ideas is neither cogitative nor volitional (whereas the essence of the mind has proven to be thinking, and all its actions volitions), it follows that this *vis* cannot be ascribed to the mind. The mind, indeed, cannot but be aware of all its faculties (at least for the time their operations occur).[27] The simple reason why I do not know, in myself, of any faculty dreaming up the world is because there is not: adventitious ideas are not factitious ideas in disguise. All nightmares and dreams, all natural impulses, must therefore be produced by something else than the mind.

In order eventually to prove that the ideas that are recalcitrant to the will in respect of both their content and their order in thought do indeed "come from things located outside me", Descartes must yet rule out another related possibility, namely, that the power to bring about these ideas resides in God, rather than in any outside world. Metaphysics cannot exclude it: an infinite being is indeed required to "sustain in existence" all finite beings at any single time; with even better reason, this same infinite being would be perfectly able to account, just in itself, for the presence in the mind of a certain number of "unintended" ideas. Descartes, however, claims that this cannot happen, as the subject finds in himself a "great propensity" to believe that these ideas are indeed coming from outside the mind. Moreover, the subject is said to lack the epistemological resources to be able ever to figure out whether this is or is not the case. The subject would thus be necessarily and irremediably deceived if the cause of this sort of idea

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which would be unsound. But I say that this idea represents it to me as a substance which can exist even though everything belonging to the body be excluded from it; from which I form a positive argument, and conclude that it can exist without the body".

[26] Cf. *Meditationes* VI; AT VII 78, 2-20; CSM II 54. For an analysis of Descartes' alternative argument for the mind-body distinction based on (in)divisibility, see Steven J. Wagner, "Descartes's Arguments for Mind-Body Distinctness", *Philosophy and Phenomenological Research* 43/4 (1983): 499-517.

[27] Cf. *Responsiones* IV; AT VII 232, 5-7. 246, 22 - 247, 2; CSM II 172*: "Although we are always aware in act of the acts or operations of our minds, we are not always aware of the mind's faculties or powers, except in potency. By this I mean that, as soon as we employ one of our faculties (*cùm ad utendum aliquâ facultate nos accingimus, statim*), if the faculty in question resides in our mind, we become aware of it in act. Therefore, we may deny that something is in the mind if we are not capable of becoming aware of it".

were not the external world, but rather God (or some other inferior spiritual substance). But the supremely perfect being cannot be a deceiver, since this would imply an imperfection on its part. Therefore, Descartes concludes, material objects must exist and the ideas whose content and occurrence is passively given to the subject do indeed come from them.[28]

The argument, based as is partly on the notion of an irreparable ignorance on the part of the subject, and partly on a deep-seated propensity that appears to come very close to be a mere prejudice, is admittedly far from convincing (although §9 makes clear that Descartes' line of reasoning has its own good points). As a matter of fact, none of Descartes' followers seem to have been convinced by it, even though this might have had to do with their different theory of causation – the same that eventually resulted in Occasionalism – rather than with dissatisfaction with this specific argument. A close analysis thereof lies beyond the scope of this work. The strategy, the goal and, even more importantly, the general point of Descartes' reasoning should, nonetheless, be clear enough: the mind is thoroughly transparent to itself and its most basic and

[28] Cf. *Meditationes* VI; AT VII 79, 22 - 80, 4; CSM II 55. Descartes presented the *Principles* as an *abrégé* of his philosophy (To Mersenne, December 1640; AT III 259. AT IX-2 16). As far as the proof of the external world is concerned the *Principia* do indeed simply sum up the demonstrations worked out by Descartes a few years before; cf. *Principia* II 1; AT VIII-1 40, 5 - 41, 13; CSM I 221. Not all interpreters agree with this reading, though. Garber, in particular, pointed out that the in the *Principles* there is no appeal to an "active faculty" and argued, on a more general level, that the terminology Descartes used to describe the relation between our sensory ideas and the object they come from seems studiously non-causal; cf. Daniel Garber, *Descartes' Metaphysical Physics* (Chicago - London: University of Chicago Press 1992), 365-66. Id., "Descartes on Occasionalism" in Steven Nadler ed., *Causation in Early Modern Philosophy* (University Park, PA: Pennsylvania State University 1993), 20-21. In *Principia* II 1 Descartes does yet claim, in what look like straightforward causal terms, that the particles of matter "make us have (*efficiunt ut habeamus*) the sensations of colors, smells, pain and so on". The argument, moreover, opens by pointing out that "it is not in our power" to bring about the sensory ideas we prefer (*neque enim est in nostrâ potestate efficere, ut unum potiùs quàm aliud sentiamus*), clearly implying that this power must be something (or someone) else's; cf. David Scott, "Occasionalism and Occasional Causation in Descartes's Philosophy", *Journal of the History of Philosophy* 38 (2000): 503-28. Scott's paper, furthermore, convincingly argues that the same holds true for the 1647 French translation of the 1644 text; see also Tad M. Schmaltz, *Descartes on Causation* (Oxford: Oxford University Press 2008), 152. I think that the reason why the concept of an "active faculty" – were it of the mind or of external objects – does not feature explicitly in the proof of the *Principles* is simply because in this abridged exposition of his philosophy Descartes decided not to even mention the distinction between factitious, innate and adventitious ideas (if I am not mistaken even "innate" shows up only once in the entire work; cf. *Principia* I 39; AT VIII-1 19, 28). See nonetheless *Principia* II 3; AT VIII-1 42, 2-3: "solo intellectu, ad ideas sibi à naturâ inditas… attendente". Accordingly, the possibility of an "active faculty" of the mind (and, once this has been ruled out, of external objects) to produce the ideas of sensible qualities could not be discussed in detail. The 1647 *Meditations* present indeed a faithful translation of the 1641 argument and speak expressly of a *faculté active* of bodies to *former & produire* ideas in the mind; cf. AT IX-1 63.

unshakable convictions concerning factitious and adventitious ideas are true. Descartes can thus eventually claim to have proven that the ideas whose representational content and place in the timeline of thoughts are freely determined by the subject are products of the mind, whilst the opposite class of ideas, whose object *and* occurrence are given, are the effects of objects located outside it.

According to Descartes, to conclude, there is however one more thing that "Nature has apparently taught me" concerning adventitious ideas, namely, that they are similar to the objects from which they come. But, Descartes immediately asks, "what is my reason for thinking so?"[29] According to Descartes, since adventitious ideas can be demonstrated to represent bodies, and given the differences between my adventitious ideas, it is indeed to be concluded that bodies present at least corresponding differences (by leaving aside for the time being the case of perceptual errors): "from the fact that I sense very different colors, sounds, smells, flavors, hot, hardness and the like, I am correct in inferring that in the bodies which are the source of these various sense-perceptions there are some corresponding, though perhaps non-similar, differences (*iis respondentes, etiamsi forte iis non similes*)".[30] As already pointed out in §0 and as §§9-11 will explain more in detail, according to Descartes the adventitious ideas of the senses cannot however been taken to represent their objects *precisely as they are*, for how much Aristotelians could have taken to be "obvious" that "a body transmits [to the perceiver] its likeness (*similitudo*) rather than something else".[31] Descartes contests on his part that there is however "no convincing argument for supposing that there is something in the fire similar (*aliquid simile*) to the heat". According to Descartes, the only legitimate conclusion to be drawn on the basis of the theory of ideas and the metaphysics he had built thereupon was indeed that "that there is *something* in the fire, whatever it may eventually turn out to be (*aliquid, quodcunque demum sit*), which produces in us the feelings of heat".[32] If according to Descartes the existence of external objects could be firmly demonstrated by 'first philosophy', whether bodies have "the selfsame whiteness or greenness which I perceive thought my senses to be present in the body"[33] – i.e. whether they are colored as we perceive them to be – was indeed to be established on a different basis: by the theory of vision, indeed, and analogously for the other sensibles.

[29] *Meditationes* III; AT VII 38, 14-16; CSM II 26* (emphases added).

[30] *Meditationes* VI; AT VII 81, 17-22; CSM II 56*.

[31] *Meditationes* III; AT VII 38, 20-22; CSM II 26*.

[32] *Meditationes* VI; AT 83, 6-12; CSM II 57.

[33] *Ibid.* AT VII 82, 1-10; CSM II 56-57.

§3. Innate ideas

The most interesting case of Descartes' threefold taxonomy of ideas is, however, represented by innate ideas, which occupy a middle ground between the adventitious and the factitious ones. Of the two factors considered by Descartes in drawing up his classification, the ideas' representational content and their place in the timeline of thoughts, innate ideas are, for Descartes, open as far as the latter is concerned but fixed as regards the former. Or, to put it more precisely, there exists a class of ideas with these features (this is, for Descartes, just a matter of description), but these features are, for Descartes, enough to prove that these notions "derive from nothing else but the subject's nature" (*non aliunde habeo quàm ab ipsâmet meâ naturâ*), *viz*. that they are innate.[1] In order to single out the specific phenomenological features of this group of ideas, by far the most problematic of this taxonomy, Descartes takes advantage of a comparison with factitious and adventitious ideas, by showing in what respects they differ and in what respects they agree with the innate ones.

Adventitious ideas are not, in fact, the only notions whose representational content, contrary to what happens with factitious ones, cannot be modified merely at a whim. Descartes' standard examples are taken from geometry. In the *Meditations*, however, Descartes' remarks on triangles and the like are mostly preliminary to the even more controversial claim which maintains that the idea of God too is innate. To prove this claim Descartes starts by remarking that

> I am not free to think of God without existence (that is, of a supremely perfect being without a supreme perfection) as I am free to imagine a horse with or without wings.[2]

The latitude of the subject in making up hippogriffs is in fact confronted here with an ideal object that cannot be altered at a whim, since its conceptual marks come together out of necessity. In this case is indeed an analytical truth that the supremely perfect being must possess all perfections, just as is an analytical truth that a bachelor cannot have a wife.[3] To illustrate this point Descartes considers once again geometrical objects, of which mathematicians are still discovering properties that they had never envisaged when they had first thought of these

[1] Cf. *Responsiones* II; AT VII 133, 20-12: "*Hanc ideam mihi esse innatam*, sive non aliunde quam a meipso mihi advenire". The 1647 French translation renders *innata idea* with "idée… née et produite avec moi"; cf. AT IX-1 41.

[2] *Meditationes* V; AT VII 67, 8-11; CSM II 46*.

[3] *Ibid.* AT VII 66, 7-15.

figures or drawn them on paper. Let us take as an example Euler's polyhedron formula, possibly already discovered by Descartes.[4] Descartes' point is that mathematicians cannot be said to have come up with the notion of a polyhedron to which, at a later stage, they decided to ascribe a property, in the same way as someone in antiquity decided to add a pair of wings to a horse. The intrinsic necessity that ties together the conceptual marks of the former and which allows us to derive some new properties (such as the relation between the number of vertices, faces and edges in a polyhedron) from the properties already discovered is, in fact, completely lacking in the latter case, where no entailment relation between the different properties holds.[5] While it remains up to anyone who happens to imagine a hippogriff to decide whether to depict this latter as white, as black, or as some other color that he may choose, no mathematician ever decided that V – F + E makes 2 rather than 3. There is, therefore, a very strong sense in which Descartes would have contested that Euler's formula is indeed Euler's, even without having to argue that it was he himself that first *realized* that V – F + E = 2:

> I find within me countless ideas of things which, even though they may exist anywhere outside me, still cannot be called nothing. For, although in a certain sense they can be thought of at will, they are not made by me, but have their own true and immutable natures (*quamvis a me quodammodo ad arbitrium cogitentur, non tamen a me finguntur, sed suas habent veras & immutabiles naturas*). When, for example, I imagine a triangle, even if perhaps no such figure exists, or has ever existed, anywhere outside my thought, there is still a determinate nature, or essence, or form of the triangle that is immutable and eternal, and not made by me or dependent on my mind (*quæ a me non efficta est, nec a mente meâ dependet*). This is clear from the fact that various properties can be demonstrated of the triangle... Since these properties are ones that I now clearly recognize whether I want to or not (*velim nolim*), even if I never thought of them at all when I previously imagined the triangle, it follows that they cannot have been made by me (*a me effictae*).[6]

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[4] On the priority issue and for a useful commentary of Descartes' notes on the topic, see Pasquale J. Federico, *Descartes on Polyhedra: A Study of the* De Solidorum Elementis (New York - Heidelberg - Berlin: Springer 1982).

[5] Cf. *Responsiones* V; AT VII 371, 8-26. To Mersenne, 16 June 1641; AT III 383; K 183*: "Now if from a constructed idea (*Idea facta*) I were to infer what I explicitly put into it (*explicite posui*) when I was constructing it, I would obviously be begging the question. But it is not the same if I draw out from an innate idea something which was implicitly contained (*implicite continebatur*) in it but which I did not at first notice in it. Thus, I can draw out from the idea of a triangle that its three angles equal two right angles, and from the idea of God that he exists, etc. so far from being a begging of the question, this method of demonstration is even for Aristotle the most perfect of all, for in it the true definition of a thing occurs as the middle term". On the issue see Gregory Brown, "*Vera Entia*: The Nature of Mathematical Objects in Descartes", *Journal of the History of Philosophy* 18 (1980): 23-37.

[6] *Meditationes* V; AT VII 64, 6-24; CSM II 44-45*. Descartes' understanding of these "true and immutable natures" is, as known, problematic. For some attempts to reconcile Descartes' apparently contradictory statements on the topic and find a middle-way between Platonism and Conceptualism see at least Tad M. Schmaltz, "Platonism and

The subject's realization that his power of manipulating the representational content of his own thoughts is confronted here – once again – with its limits is, for Descartes, the decisive piece of evidence that these ideal contents (the essences of geometrical objects, for instance) preexist any actual thinking of them. Since these ideal contents are "immutable", it follows that the mind can only apprehend them the way they are and always have been. The subject, consequently, cannot be said to bring these ideas into being as it does for the factitious ones, but only to bring them about, or – to try to phrase this still more appropriately – to "call them to mind", or to "summon them up". Descartes sometimes also couches this theory in the mythical language of *anamnesis* and speaks of drawing inborn notions *ex mentis thesauro* – where *mens* knowingly oscillates between mind and memory.[7]

Obviously enough, the passage from the ideal givenness of these notions to the claim that they are inborn in the mind cries out to be supported by an argument, whilst Descartes seems to move almost without noticing this from the former to the latter point. This apparent *non sequitur* can, however, be mitigated by remarking that, according to Descartes, what "derives from nothing else but the subject's own nature" are not the *notions* of substance and truth *as such*, but only the subject's *capacity* to grasp them: *quòd intelligam quit sit res*, as he put it while introducing the concept and as a matter of fact in the *Rules* only this faculty was expressly qualified as innate.[8] As Kenny had already pointed out, Descartes' innatism is not indeed so much making a claim about some *items of thought* being given to the mind as about the mind's *faculty* to think of them, although Kenny ended up watering down their point by speaking of ideas themselves in terms of *dispositions* (a reading adopted, in a more qualified way, also by Jolley).[9]

Descartes' View of Immutable Essences", *Archiv für Geschichte der Philosophie* 73/2 (1991): 129-70. Lawrence Nolan, "The Ontological Status of Cartesian Natures", *Pacific Philosophical Quarterly* 78/2 (1997): 169-94, who has rightly insisted on the opposition between innate and factitious ideas as crucial for understanding the passage above. Raffaella De Rosa, "Rethinking the Ontology of Cartesian Essences", *British Journal for the History of Philosophy* 19 (2011): 605-22. Helen Hattab, "Descartes on the Eternal Truths and Essences of Mathematics: An Alternative Reading", *Vivarium* 54 (2016): 204-49.

[7] Beside the passage quoted below, see *Meditationes* V; AT VII 63, 23 - 64, 5. *Epistola ad Voetium*, AT VIII-2 166, 21 - 167, 7.

[8] Properly speaking, even the word "innate" is absent, as such, from the *Rules*. Descartes, however, maintains that simple natures can be intuited *lumine quodam in nobis insito* and that purely intellectual objects can be known *per lumen quoddam ingenitum*; *Regulæ* VI; AT X 383, 13-14. XII; AT X 419, 9-10.

[9] Anthony Kenny, *Descartes: A Study of his Philosophy* (New York: Random House 1968), 101. Nicholas Jolley, *The Light of the Soul: Theories of Ideas in Leibniz, Malebranche, and Descartes* (Oxford: Clarendon Press 1990), 17-24, 33-

From the fact that the mind can entertain thoughts of this sort whenever it wants, Descartes felt himself justified in inferring that the mind is naturally endowed, right from the beginning, with the *faculty* of bringing them about. What is inborn in the mind is thus not so much certain items of thought, as the subject's capacity to think of them:

> These ideas, along with the faculty they come from, are innate in us, i.e. they always exist within us potentially. Indeed, to exist in some faculty does not mean to exist in act, but only in potency, since the term "faculty" denotes nothing but a potentiality.[10]

Reacting against Herbert of Cherbury's metaphor of the mind as a "closed book" were all innate ideas would be inscribed, Descartes sarcastically remarked that "all truths known by themselves are not always portraited in act in some part of our mind the way several lines are contained in a book by Vergil", as he objected against Hobbes that "when we say that an idea is innate in us, we do not mean that it is always there before us. For certainly no idea would be innate, in this sense. We simply mean that we have within ourselves the faculty of summoning them up".[11] As Descartes insists, the subject is indeed free to muse on innate notions whenever he prefers, "at will" (*ad arbitrium*), since they do not force themselves upon the subject in the way that adventitious ideas do. This conception implies, of course, that someone could pass his entire life without ever pondering on polyhedra or speculating on the question of a supreme being. Descartes' only point is, in fact, that, if this one person ever came across the idea of God, he could not help but think of this being in one way only:

> Although it is not necessary that I ever light upon any thought of God (*non necesse sit ut incidam unquam in ullam de Deo cogitationem*), whenever I do choose to think of the first and supreme being, and draw forth the idea of God from the treasure house of my mind, it is necessary that I attribute all perfections to him.[12]

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[10] *Notæ in Programma*; AT VIII-2 361; CSM I 305*.

[11] Cf. *Annotationes*; AT XI 655 (my translation). Cf. Herbert of Cherbury, *De Veritate, prout distinguitur a revelatione, a verisimili, a possibili, et a falso* (London: Augustinum Matthæum 1633[2]), 54. For Descartes' reply to Hobbes, see *Responsiones* III; AT VII 189, 1-4; CSM II 132*: "Cùm dicimus ideam nobis aliquam esse innatam, non intelligimus illam nobis semper obversari: sic enim nulla prorsus esset innata; sed tantùm nos habere in nobis ipsis facultatem illam elicendi". Descartes also rejected Herbert of Cherbury's cases *ex consensu gentium* (or *omnium*) on similar grounds, thereby paving the way to Locke's well-known criticism; see §18.

[12] *Meditationes* V; AT VII 67, 19-24; CSM II 46-47*. Cf. To Hyperaspistes, August 1641; AT III AT 430.

The fact that innate ideas are *not* always present to the mind is not indeed an unintended consequence of Descartes' conception of innatism, or one of its weakest points, but rather (together with the non-arbitrariness of its content) the defining phenomenological feature of this class of ideas. Moreover, just as this thesis excludes the notion that an idea must be present to the mind – to any mind – at *all* times, it also rules out that the notion that ideas of this sort should be present in all cultures – to *all* minds. Descartes, accordingly, did not feel challenged by the criticism of various Paris-based scientists, who objected that some newly-discovered populations from all around the world had no clue of any god-like being.[13] In contrast to Herbert of Cherbury, universal consent is indeed a criterion neither for innatism nor for truth (the topic is discussed more in detail in §18, which shows how this piece of Descartes philosophy also results from his opening doubt in the existence of other humans beings, who are yet precisely the beings who will be supposed to "consent").

By reflecting on the freedom of the subject with respect to the idea of God (free to think of it or not, but, in the case where he should happen to think of it, not free to think of it in any but one specific way) and confident that his tripartite taxonomy of ideas, based as is on a systematic consideration of the possibilities of the will as confronted with the object and occurrence of ideas, is exhaustive, Descartes can thus draw one of the key conclusions of the *Meditations*. In Descartes' mind, no very much greater effort will still be required in order eventually to prove, from this innate, immutable idea, that what it represents truly exists:

> I have not acquired the idea of God from the senses and it has never come to me unexpectedly (*nec unquam non expectanti mihi advenit*), as usually happens with the ideas of things that are perceivable by the senses, when these things present themselves to the external sense organs – or seem to do so. Nor has it been made by me (*nec etiam a me efficta est*), for I plainly cannot either take away anything from it or add anything to it. The only remaining alternative is that it is innate in me, just as the idea of myself is innate in me.[14]

Descartes' claim that an idea whose representative content is given but whose occurrence in the timeline of thought is not is inborn in the mind has thus finally revealed its true *raison d'être*: supplying the grounds for proving that the supreme being exists, as the complementary investigation into adventitious ideas is intended to prove that external objects too do exist. Far from being a minor issue, Descartes' tripartite taxonomy of ideas proves thereby to be the bedrock of some of the most challenging contentions of his metaphysics.

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[13] *Objectiones* II; AT VII 124, 9-12.

[14] *Meditationes* III; AT VII 51, 6-14; CSM II 35*.

§4. "There is nothing in our ideas which is not innate to the mind"

Descartes' controversy with Regius is one of the most illuminating chapters of Descartes' late philosophy. One among the many reasons why this quarrel is especially relevant is because at one point Descartes seems to work out an alternative conception of innateness to better win the argument with his erstwhile disciple. This allegedly new conception, epitomized by the quotation that gives the title to this chapter, seems, however, to run counter to the model presented in the *Meditations*. The contrast cannot even be explained away by appealing to a development in Descartes' views, since Descartes stuck to the classification of ideas introduced in 1640 right up until the end of his life. Actually, Descartes distinguishes innate ideas from the ideas that "proceed from a resolution of my will" and the ones which "proceed from external objects" only a few lines before declaring that "there is nothing in our ideas which is not innate to the mind".[1] This apparent discrepancy, however, disappears as soon as the context in which this statement was made is taken into account.

The history of the changing relationship between Regius and Descartes, which shifted from an almost ideal relationship of master and apostle to excommunication and subsequent public accusation is too complex to be addressed here.[2] Regius presented his case against innate ideas in his *Fundamenta physices*, whose publication in 1646, contrary to Descartes' pressing advice, put an end to their collaboration. Regius, to speak more specifically, challenged innatism by contending that sense-perception and the operations of the imagination suffice by themselves to account for all human notions and skills, without any need to suppose an additional faculty detached from matter (such as Descartes' pure intellect). The formation of all purportedly innate mental items can in fact be accounted for, according to Regius, by simply appealing to the faculty of thinking, which alone would be inborn in all men:

> In order for the mind to think it seems that no innate ideas, images, notions or axioms are required. *The innate faculty of thinking* suffices by itself to perform all cognitive operations. This is evident in the perception of pain, color, flavors and the like, which are correctly perceived by the mind, even though

[1] *Notæ in Programma*; AT VIII-2 358, 1-6.

[2] On the topic, see Theo Verbeek, *Descartes and the Dutch: Early Reactions to Cartesian Philosophy, 1637–1650* (Carbondale and Edwardsville, IL: Southern Illinois University Press 1992). Id., "Le contexte historique des *Notæ in Programma quoddam*" in Theo Verbeek ed., *Descartes et Regius: Autour de l'*Explication de l'esprit humain (Amsterdam - Atlanta: Rodopi 1993), 1-33. Cf. Geneviève Rodis-Lewis ed., *Lettres à Regius et Remarques sur l'esprit humain* (Paris: Vrin 1959), 146-53.

> none of their ideas are innate to the mind. Nor is there a reason why nature should have implanted in the mind some ideas more than others (*ulla est ratio, cur unæ ideæ magis à natura sint insitæ, quàm aliæ*).[3]

In his *Notes on a Certain Broadsheet* (1648), a point-to-point response to a set of twenty-one theses published anonymously by Regius at the end of 1647, Descartes objected that Regius had however badly mischaracterized his position:

> In article twelfth the author's disagreement with me seems to be merely verbal. When he says that "the mind has no need of ideas, or notions, or axioms which are innate" while ascribing to the mind the "faculty of thinking" (presumably natural, or innate), he is plainly saying the same as I, though verbally denying it. I have never written or taken the view that the mind requires innate ideas that are something distinct from its own faculty of thinking. I did, however, observe that there were certain thoughts within me which neither proceed from external objects, nor from a resolution of my will, but solely from the faculty of thinking within me (*nec à voluntatis meæ determinatione procedebant, sed a solâ cogitandi facultate, quæ in me est*), and I called these ideas, or notions, that are the forms of these thoughts "innate" in order to distinguish them from what I called the "adventitious" and the "made" (*factis*) ideas.[4]

The bone of contention is, of course, how to understand of this "presumably natural, or innate" (*puta naturalem sive innatam*) faculty of thinking. As a matter of fact, in his 1647 broadsheet, in fact, Regius repeated almost verbatim the statement made one year before, with one crucial exception: in the latter work Regius spoke in fact of the *facultas cogitandi* by dropping the qualification of "innate" to be found in the 1646 *Fundamenta*.[5] Descartes promptly noticed the omission and integrated it into his text. Regius himself, at any rate, was to restore it in the later, enlarged editions of his *Fundamenta*, which are even more unequivocal about his conceiving of this notion in almost physiological terms, as the inner constitution of the human body and its built-in responses to the stimuli of the environment. As he was eventually to make explicit

[3] Henricus Regius, *Fundamenta physices* (Amsterdam: Elsevier 1646), 251 (emphasis added).

[4] *Notæ in Programma*; AT VIII-2 357, 21 - 358, 6; CSM I 303*. Descartes wrote these *Notes* at the very end of 1647 (after December 23), which were published without his permission shortly after (already in 1648, though).

[5] Compare the passage from the 1646 *Fundamenta* quoted above ("Nulla videtur menti ad cogitandum opus esse ideis, imaginibus, notionibus vel axiomatic innatis; *sed sola innata cogitandi facultas* ipsi ad omnes actiones cogitativas peragendas sufficit") with the corresponding article of Regius' 1647 pamphlet: "Mens non indiget ideis, vel notionibus, vel axiomatis innatis: *sed sola ejus facultas cogitandi*, ipsi, ad actiones suas peragendas, sufficit" (AT VIII-2 345, 4-6; all emphases added).

after his dispute with Descartes "by the 'pure intellect' which some people speak about there is to be understood what I call imagination and judgment".[6]

In order, therefore, to refute Regius's claims, Descartes had to demonstrate that these so-called lower faculties of the mind fall short of constituting, just in themselves, the full range of man's cognitive life. In order to do this Descartes, somewhat unexpectedly, decided not to resort to any of his standard arguments about the purely intellectual nature of the ideas of the mind, God, or such matters. He resolved to confront Regius where his philosophy was supposed to be least vulnerable, with the declared objective of disposing of it once and for all. Descartes took his cue from Regius's not very felicitous remark that "there is no reason why nature should have implanted in the mind some ideas more than others". The just-mentioned gloss on innatism suggests that Descartes was in fact re-reading the 1646 book while commenting on Regius's 1647 manifesto, which is basically a collection of excerpts from the former, more detailed treatise. Descartes' *Notæ in Programma* are indeed to be read also as a collection of remarks *in Fundamenta*.

With the overt intention of provoking his interlocutor, Descartes turns Regius's statement, and indeed his entire line of reasoning, on its head, arguing that

> There is nothing in our ideas which is not innate to the mind, or faculty of thinking (*nihil sit in nostris ideis, quod menti, sive cogitandi facultati, non fuerit innatum*), with the sole exception of those circumstances which pertain to experience, such as the fact that we judge that these or those ideas that are now present to our mind refer to certain things situated outside it. We make such a judgment not because these things transmit the ideas to our mind through the sense organs, but because they transmit something which gives the mind occasion to form these ideas, by means of the faculty innate to it, at this time rather than another. Nothing reaches our mind from external objects except certain corporeal motions, as our author himself asserts in his article nineteen, in accordance with my own principle. But neither the motions themselves nor the figure arising from them are conceived by us exactly as they occur in the sense organs, as I have explained at length in my *Dioptics*. Hence it follows that the very ideas of motions and figures are innate in us. And all the more (*tantò magis*) must be innate the ideas of pain, colors, sounds and the like if, on the occasion of certain corporeal motions, our mind is to be capable of representing them to itself, for there is no similarity between these ideas and the corporeal motions.[7]

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[6] Henricus Regius, *Philosophia naturalis* (Amsterdam: Elsevier 1654), 404; *Philosophia naturalis* (Amsterdam: Elsevier 1661), 477. For Regius's empiricism and his critique of innate notions, see Delphine Bellis, "Empiricism Without Metaphysics: Regius' Cartesian Natural Philosophy" in Mihnea Dobre – Tammy Nyden eds. *Cartesian Empiricism* (Dordrecht: Springer 2013), especially 154-67. As this essay points out, the statement just quoted is not to be found in the 1646 *Fundamenta physices*.

[7] *Notæ in Programma*; AT VIII-2 358, 25 - 359, 16; CSM I 304*.

The reference to the *Dioptrics* (1637) makes clear that the argument hinges on Descartes' account of vision and, more generally, of perception, whose core theses were endorsed also by Regius. The gist of this theory, summed up very briefly, is to refute visual *species* conceived as *similitudines* issuing from the object and creeping through the optical nerves, allegedly hollow, to the brain, by replacing the keystone of medieval optics with particles impinging on the retina (for a detailed presentation of the received account of vision and Descartes' alternative account, see §§21-27). As Descartes correctly pointed out, these retinal impressions are indeed entirely similar neither to the objects which cause them, nor to the actual content of experience.[8] In the case of shapes, however, the circle drawn on paper, the impression it causes upon the retina and the corresponding content in experience belong at least to the same kind, since a circle and its projection on the retina are still both geometrical figures. The same cannot be said of a spinning particle of the second element, the motion it brings forth within the nerves and hence within the brain by impacting on the retina, and the phenomenal red, though. Therefore, Descartes concludes, if the experience of a circle cannot be explained by simply appealing to the corresponding projection onto the rear of the eye, "all the more", "with even better reason" must this hold true as regards colors. Descartes, therefore, is not defending the view that the ideas of colors are "more innate" than the ideas of figures, as his argument is sometimes presented in the literature, but only that, if the latter are innate, then *a fortiori* the former must be as well. *Pace* Winkler and Boyle, innate ideas definitely do not come in degrees in Descartes' philosophy.[9]

Descartes' point in claiming that "there is nothing *in* our ideas which is not innate to the mind" is that the *representational content* of sensory ideas is indeed *given*, rather than freely established by the subject himself, but still not fully *determined* by the objects alone. In Descartes' views, in fact, the fact that such and such a physical change occurring in the sense organs – and, thus, in the brain – gives rise to such and such a sensation rather than any other depends on the nature of the mind or, as Descartes puts it, on an "institution of nature", possibly different for sentient beings of different species (for animals, for example, were they sentient, as shown in detail in §25).[10] Even though it is only at the end of 1647, prompted by his polemic with Regius,

[8] See the entire *Fifth Discourse* of the *Dioptrics*; AT VI 114, 15 - 129, 28.

[9] Kenneth P. Winkler, "Grades of Cartesian Innateness", *British Journal of the History of Philosophy* 2 (1993): 23-44. Deborah Boyle, *Descartes on Innate Ideas* (London - New York: Continuum 2009), 29, 43-45.

[10] Descartes' "institution of nature" amounts, basically speaking, to the psycho-physiological law governing the relation between brain's and mind's states. Descartes argues explicitly that this could have been different even in

that Descartes expressly argues that the representative content of sensory ideas has to be innate, the thesis that this content is not simply *taken in* from external objects had already been established in the early French writings.[11] Descartes, actually, started to make the claim defended in the *Notes* already in the early 1640s:

> I maintain that all those ideas that involve no affirmation or negation are innate in us. For the sense organs do not bring us anything which is like the idea awoken in us on their occasion. Therefore, this idea must have been in us before.[12]

This piece of Descartes' philosophy has opened a major debate about the causal role of body and mind in perception, which is yet impossible to enter here. Accordingly, the passage just quoted has been interpreted quite differently.[13] It is crucial to notice, though, that in the *Notes* Descartes is not so much making a claim about body-mind *causation*, as about the

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the current world (i.e. without modifying any logical and physical laws). Therefore, this *could* be different for different sentient beings; cf. *Dioptrique* VI; AT VI 130, 134-37. *Meditationes* VI; AT VII 87. The topic is discussed in §25.

[11] Cf. Marleen Rozemond, "Descartes on Mind-Body Interaction: What's the Problem?", *Journal of the History of Philosophy* 37 (1999), 457-48. The thesis of a radical evolution in Descartes' conception of innateness defended by Peter Machamer – James E. McGuire, *Descartes's Changing Mind* (Princeton, NJ: Princeton University Press 2009), 1-35 and 164-97 is therefore to be rejected. For a more balanced – and, to my eyes, fundamentally correct – assessment of Descartes' philosophical evolution, see Tad M. Schmaltz, "Review Essay: *Descartes on Forms and Mechanisms*, by Helen Hattab, and *Descartes's Changing Mind*, by Peter Machamer and J. E. McGuire", *Oxford Studies in Early Modern Philosophy* 6 (2012): 349-72.

[12] To Mersenne, 22 July 1641; AT III 418; CSMK 187*. Namely, all ideas "in the proper sense of the term… as when I think of a man, or a chimera", as distinguished from *judgments*. For Descartes judgments too count of course as *cogitationes* and, therefore, as *ideas*, but he affirms he would like to reserve the term "idea" for the former class of mental items; cf. *Meditationes* III; AT VII 37.

[13] See at least Henri Gouhier, *La Vocation de Malebranche* (Paris: Vrin 1926), 83-88. Jean Laporte, *Le rationalisme de Descartes* (Paris: Presses Universitaires de France 1950[2]), 225-26. Martial Gueroult, *Descartes selon l'ordre des raisons* (Paris: Aubier-Montaigne 1968), II 101-103. Janet Broughton, "Adequate Causes and Natural Change in Descartes' Philosophy" in Alan Donagan, Anthony N. Perovich, Michael V. Wedin eds., *Human Nature and Natural Knowledge* (Dordrecht: Reidel 1986): 107-27. Steven Nadler, "Descartes and Occasional Causation", *British Journal for the History of Philosophy* 2 (1994): 35-54. David Scott, "Occasionalism and Occasional Causation". Geoffrey Gorham, "Descartes on the Innateness of All Ideas", *Canadian Journal of Philosophy* 32/3 (2002): 355-88. Tad M. Schmaltz, "Descartes on Innate Ideas, Sensation and Scholasticism: The Response to Regius" in Alexander Stewart ed., *Oxford Studies in the History of Philosophy* (Oxford: Oxford University Press 1997), 33-73. Tad M. Schmaltz, *Descartes on Causation* (Oxford: Oxford University Press 2008), 149-62.

representational content of sensory ideas (as rightly pointed out by Rozemond).[14] Even scholars (such as Garber) who see Descartes – at least the late Descartes – as an Occasionalist of sorts agree in fact that the *Notes* passages is concerned with the utter dissimilarity between the sensory stimulation and the resulting sensory idea, rather than with the causal connection between the two.[15] As a matter of fact, not even the interpreters who claim that sensory ideas are somehow caused by the *mind* (as is the case for Wee) seems willing to argue – for obvious and very sound reasons – that these ideas are brought about by the *will*, as is on the other hand the case for factitious ideas.[16] What has been said so far makes in fact clear that Descartes in the *Notes* was indeed first and foremost making a claim about the *objective* reality of ideas, not about their *formal* reality – i.e. their being *mental* items, as opposed to corporeal ones (contrary to what argued by Clarke).[17] Nor is Descartes suggesting, in an almost Kantian fashion, that the mind is endowed with an innate faculty to *intellectually* structure sensible experience by means of *judgments* (as suggested by van De Pitte and Carraud and, more recently, by Machamer and McGuire), so that innate ideas would count as innate only insofar as they are the "products" on this inborn faculty of judging (McRae's well-known reading).[18] Descartes, in the *Notes*, is indeed largely making a claim about the *second*, not the *third* degree of sense-perception. At the same time, though, Descartes is not even suggesting *e converso* that the ideas belonging to the second degree of the perceptual process – and only those – are to be likened to the "simples natures" of the *Rules* insofar as both classes of idea come before any judgments (before any perceptual judgments in the former case, before logical or metaphysical ones in the latter), these two classes constituting the "building blocks", the "mental materials", the "ultimate simples" from which all other thoughts are composed – this being Descartes' most proper concept of innate.[19] Nelsons'

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[14] Marleen Rozemond, "Descartes on Mind-Body Interaction: What's the Problem?", *Journal of the History of Philosophy* 37 (1999): 435-67, especially 449-56.

[15] Daniel Garber, *Descartes' Metaphysical Physics* (Chicago - London: University of Chicago Press 1992), 365-66. "Descartes on Occasionalism", 22-23.

[16] Cecilia Wee, "Descartes and Active Perception" in *Active Perception*, 207-21.

[17] Desmond M. Clarke, *Descartes' Philosophy of Science* (University Park, PA: Pennsylvania State University Press 1982), 48-54.

[18] Frederick van De Pitte, "Descartes' Innate Ideas", *Kant-Studien* 76 (1985): 363-84. Frederick van De Pitte – Vincent Carraud, "Descartes et Kant: Empirisme et Innéité", *Les Études philosophiques* (1985): 175-190. Peter Machamer – James E. McGuire, *Descartes's Changing Mind*, 184-86. Robert McRae, "Innate Ideas" in Ronald Butler ed., *Cartesian Studies* (Oxford: Blackwell 1972), 32-54, especially 51.

[19] Alan Nelson, "Cartesian Innateness" in Janet Broughton – John Carriero eds., *A Companion to Descartes* (Malden: Blackwell 2008), 319-33, in particular 326: "ideas are adventitious, however, when they involve the third grade of sensory response".

reading clashes in fact with Descartes' statement in the *Notes* that shape-ideas and color-ideas (despite belonging to different stages of the perceptual process) are perfectly on a par under this regard, they both being equally "innate in us". And even the less, to conclude, is Descartes making the case for a never mentioned "meta-faculty" which would be regulating "the mind's faculty for having sense ideas so that just the right sense ideas appear at just the right times", as supposed by Broughton.[20]

As a matter of fact, in none of his writings did Descartes ever call for innate ideas to explain *any* feature or stage of the sensory process. The detailed analyses of the visual process (for Descartes the by far most complex instance of sense-perception) set forth in the *Treatise on Man* and in the *Dioptrique* do indeed never mention innate ideas, and the same holds true for the *Sixth Set of Replies*. The absence of any explicit reference to innate ideas also in this text is even more significant if one considers that Descartes, in the *Meditations*, studiously dropped some of the most significant theses advanced in the 1630s in order to emphasize as much as possible the role of the understanding in the visual process, as documented in detail by Hatfield.[21] How to read this passage from the *Sixth Replies* is notoriously a matter of debate among scholars, and a proper analysis thereof would require entering quite a bit into the specifics of Descartes' theory of vision, so that it has to be postponed to §27. As for the present, though, it should suffice to make clear that in the *Sixth Replies* Descartes is openly *not* appealing to the intellect *qua* the faculty of innate ideas. According to Descartes the sense-perception of both colors and shapes – of both secondary and primary qualities, namely – although possibly requiring some high-order cognitive operations such as calculations, reasoning and judgments, is in fact attained independently of any reference to inborn notions. As masterfully pointed out by Simmons, the deep bifurcation in the Cartesian mind is not between the sensing of secondary qualities and the more or less intellectual perceiving of primary qualities, but between sensory perception in general (as encompassing the perceiving of both colors and shapes) and purely intellectual perception.[22] Accordingly, even a dyed-in-the-wool anti-innatist as Locke could argue for an account of visual perception along Descartes' lines, and one of the harshest opponents of both

[20] Broughton, "Adequate Causes and Natural Change in Descartes' Philosophy", 19.

[21] See in particular Gary Hatfield, "On Natural Geometry and Seeing Distance Directly in Descartes" in Vincenzo De Risi ed., *Mathematizing Space: The Objects of Geometry from Antiquity to the Early Modern Age* (Berlin: Birkhäuser 2015), 157-92.

[22] Alison Simmons, "Descartes on the Cognitive Structure of Sensory Experience", *Philosophy and Phenomenological Research* 67/3 (2003): 549-79.

Descartes' theory of innate ideas and of his "humour of making one see by geometry" never drew a connection between these two issues.[23]

It has however been recently claimed that, according to Descartes, some innate ideas would be always "latently" accompanying *all* perceptions. More in particular, in the case of sense-perception this "latent intellectual content" would be provided by the innate idea of a *res extensa*, which would accordingly "structure" (in a non-inferential way) color-sensations as to make them the perceptions *of a colored body*.[24] De Rosa's proposal is fascinating, but in the case of sense-perception the lurking innate idea of the *res extensa* is indeed so latent to never surface even in Descartes' most detailed accounts of the perceptual process. As it turns out to be the case, De Rosa's main reason to advance this reading was to avoid assuming the intentional character of sense-perceptions as primitive, and to spell it out in internalist terms. There are indeed some good theoretical reasons to argue along these lines, and I take De Rosa to have positively established that Descartes endorsed an *internalist* account of sensory perception (although to be further qualified in causal terms). Some of the details of De Rosa's reading, especially as far as the point at stake is concerned, are yet quite too speculative.[25]

What De Rosa takes to be the best piece of evidence if favor of her reading turns in fact out to be articulating a quite different point of Descartes' philosophy. The passage at stake is from the *Fifth Replies*, where Descartes criticized Gassendi's epistemology of mathematical objects by arguing that

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[23] See, respectively, John Locke, *An Essay concerning Human Understanding* II ix 8; ed. Nidditch, 145-46. George Berkeley, *An Essay towards a New Theory of Vision* §53; ed. Luce – Jessop I 200.

[24] Raffaella De Rosa, *Descartes and the Puzzle of Sensory Representation* (Oxford: Oxford University Press 2010), 124-31 and 169-74, where De Rosa discusses her position in relation to Simmons'. De Rosa already presented the basics of this interpretation in her "Locke's *Essay* Book I: The Question-Begging Status of the Anti-Nativist Arguments", *Philosophy and Phenomenological Research* 69/1 (2004): 37-64, see in particular 50-53. Innate ideas, according to De Rosa, would not therefore be "dispositions" – as argued for example by Kenny – but "implicitly known since birth" (53). De Rosa makes quite a good case for her reading as far as the *cogito* reasoning (which implies innate notions such as the one of existence, though and the like) is concerned, but the application of the same explanatory paradigm to the case of sense-perception does not seem to be justified by the texts.

[25] As a matter of fact, in her rejection of Pessin's "purely internalist account" (according to which sensory representation had been taken by Descartes as a primitive, a conclusion that De Rosa intends to avoid thanks to her account of innate ideas), De Rosa argued mostly from theoretical grounds, rarely referring to Descartes' texts; cf. De Rosa, *Descartes and the Puzzle of Sensory Representation* 118-24. Cf. Andrew Pessin, "Mental Transparency, Direct Sensation and the Unity of the Cartesian Mind" in Jon Miller ed., *Topics in Early Modern Philosophy of Mind* (Dordrecht: Springer 2007), 1-37.

> When in our childhood we first happened to see a triangular figure drawn on paper, it cannot have been this figure that showed us how we should conceive of the true triangle studied by geometers, since the true triangle is contained in the figure only in the way in which a statue of Mercury is contained in a rough block of wood. But since the idea of the true triangle was already in us, and could be conceived by our mind more easily than the more composite figure of the triangle drawn on paper, when we saw the composite figure we did not apprehend the figure we saw, but rather the true triangle (*visa ista figura composita, non illam ipsam, sed potius verum triangulum apprehendimus*). It is just the same as when we look at a piece of paper on which some lines have been drawn in ink to represent a man's face: the idea that this provoke (*excitatur*) in us is not so much the idea of these lines as the idea of a man. Yet this would certainly not happen unless the human face were already known to us from some other source, and we were more accustomed to think of the face than the lines drawn in ink; indeed, we are often unable to distinguish the lines from one another when they are moved a short distance away from us. Therefore, we could not recognize (*agnoscere*) the geometrical triangle from the diagram on the paper unless our mind already got the idea of it from somewhere else (*aliunde*).[26]

Contrary to what implied by Chomsky and expressly maintained by De Rosa, the intention of Descartes' reply is *not* however to "illustrate… the sense in which innate ideas structure the content of our sensory perceptions".[27] The whole point of Descartes' argument is in fact only to refute Gassendi's abstractionist theory of mathematical knowledge by showing that the notion of a triangle cannot be *derived* from the senses, so that it must be inborn in the mind. According to Descartes, as he had made clear enough in the *Treatise of Man* and in the *Dioptrique* and as we will argue once again the *Sixth Replies*, the visual (and more in general, sensory) process does in fact account by itself – independently of any innate ideas – for the perception of shapes. "When we saw the composite figure, we did not apprehend the figure we saw", claims in fact Descartes, making crystal-clear that the figure drawn on paper is seen (and seen *as a figure*) before any innate ideas comes in. Descartes, yet, also claims that shapes such as triangles (perfect triangles – as if they could be of imperfect ones) are hardly to be found in bodies, so that the objects we are confronted with simply cannot provide the material for us to come up with like

[26] *Responsiones* V; AT VII 382, 3-24; CSM II 262*.

[27] De Rosa, *Descartes and the Puzzle of Sensory Representation*, 127. *Ibid*.: "Descartes claims that the presence of the idea of a triangle in the mind is what allow us to *see* and *recognize* particular triangles, that is, it is what allows us to have the sensory perception *of* a triangle" (emphases in the original). Chomsky' reading of the passage (in case I understand it correctly) is ambiguous between the reading suggested here below and De Rosa's, in part because he discusses Descartes' views on the topic alongside Cudworth's, and as largely equivalent. Chomsky, at any rate, seems to advocate for the understanding a role in the perceptual process that goes quite beyond Descartes' texts; cf. Noam Chomsky, *Cartesian Linguistics* (New York: Harper and Row 1966), 60-69.

notions, *contra* Gassendi. The passage that immediately precedes the one just quoted leaves indeed no doubt about Descartes' intentions:

> I do not, incidentally, concede that "the ideas of these figures ever came into our mind via the senses", as everyone commonly believes. For although the world could undoubtedly contain figures such as those the geometers study, I nonetheless maintain that there are no such figures in our environment except perhaps ones so small that they cannot in any way impinge on our senses. Geometrical figures are in fact composed for the most part of straight lines; yet no part of a line that was really straight could ever affect our senses, since when we examine through a magnifying glass those lines which appear most straight we find they are quite irregular and always form wavy curves.[28]

According to Descartes, we do indeed perceive, apart from all innate notions, the shapes drawn on paper, and our sense-perceptions are *by themselves* about bodies. But just as, in reading, we are immediately confronted with the meanings of the words rather than with the shapes of the characters these words are made of, so by looking at a sheet of paper we immediately move beyond the actual traces drawn on it to acknowledge a human face and the innate notions of our mind. In Descartes' world (and not only in his) it makes indeed perfect sense for the mind to be more interested in the ideal contents of its own thought, in the other fellow-minds and in their thoughts rather than in any scribbles on a tattered foolscap.

One might still be wondering, however, how the statements of the 1648 booklet can be reconciled with the doctrine of the *Meditations* or, in fact, even with that of the *Notes* themselves, since here too, as has already been noted, Descartes distinguishes between adventitious ideas, innate ideas and the ideas that "proceed from a resolution of the will".[29] A closer look at the text reveals yet a few all-important qualifications:

> There is nothing in our ideas which is not innate to the mind – or faculty of thinking – *with the sole exception of those circumstances which pertain to experience*, such as the fact that we judge that these or those ideas that are *right now present to our mind* refer to certain things situated outside it. We make such a judgment not because these things transmit the ideas to our mind through the sense organs, but because external things

[28] *Responsiones* V; AT VII 381, 20 - 382, 3; CSM II 262*. See already *Meditationes* V; AT VII 64, 25- 65, 2; CSM II 45*: "It would be beside the point for me to say that since I have perchance (*forte*) seen bodies of triangular shape, the idea of the triangle may have come to me from external things by means of the sense organs. For I can think up countless other shapes which there can be no suspicion of my ever having encountered through the senses".

[29] *Notæ in Programma*; AT VIII-2 358, 2-3. As so till the end of his life; see To Clerselier, 19 April 1649; AT V 354.

transmit something which gives the mind occasion to form these ideas, by means of the faculty innate to it, *at this time rather than another*.[30]

Descartes' point, in short, is that the *order* in which the ideas of sensible qualities follow one another in the mind's stream of thoughts is not determined by the mind itself (as is the case in Leibniz's monadology, for example), but by the objects that are confronting it "right now", "at this time rather than another", remarks which clearly echo the *nunc*, the *iam* and the manifold kindred temporal expressions by which the *Meditations* refer to the "out of the blue" character of adventitious ideas. At this point, however, the claim that the adventitious ideas of sensible qualities present themselves like innate ideas except for the fact that their occurrence in the timeline of thoughts in not under the subject's control should come as no surprise.[31]

As this section has tried to demonstrate, Descartes classified ideas into factitious, innate and adventitious according to whether the subject is able to freely determine both the idea's occurrence in the timeline of thoughts *and* its representative content, only the former, or neither of these, thereby intending to make certain that the taxonomy he was advancing is both philosophically grounded and exhaustive. As shown, the two factors according to which ideas are distinguished derive from the two points of view in terms of which *any* idea can be considered: either as a mental state or, alternatively, as the representation of something, which Descartes refers to as, respectively, the *formal* and the *objective* reality of an idea. The doubts concerning the existence of anything besides the thinking "I" required in fact Descartes to take as the starting point of his enquiry nothing but the mind and its ideas, studied from the first-person perspective through introspection: it was therefore only from these ideas that, according to the standards that he had set for himself, Descartes had to move in order to establish the

[30] *Ibid.* AT VIII-2 358, 25 - 359, 5; CSM I 304*: "Adeo ut nihil sit in nostris ideis, quod menti, sive cogitandi facultati, non fuerit innatum, solis iis circumstantiis exceptis, quæ ad experientiam spectant: quòd nempe judicemus, has vel illas ideas, quas nunc habemus cogitationi nostræ præsentes, ad res quasdam extra nos positas referri: non quia istæ res illas ipsas nostræ menti per organa sensuum immiserunt, sed quia tamen aliquid immiserunt, quod ei dedit occasionem ad ipsas, per innatam sibi facultatem, hoc tempore potiùs quàm alio, efformandas" (emphases added).

[31] It cannot thus be maintained that, in the *Notes*, Descartes "does not deal with the issue of involuntariness at all", as claimed by Margaret D. Wilson, "Descartes on the Origin of Sensation", *Philosophical Topics* 19/1 (1991), 305. Therefore, and even more relevantly, the theory presented in the *Notes* does not invalidate the proof of the existence of the external world advanced in the *Meditationes* and in the *Principia*, as convincingly shown by Schmaltz, "Descartes on Innate Ideas", 39-44.

existence of God and of the outside world. In order to prove the latter, furthermore, Descartes had to study the interplay of will and understanding so to refute the possibility of a faculty of the mind that escapes consciousness but still affects it, and establish his grand claim about the transparency of the mind. Descartes' distinction between factitious, innate and adventitious ideas cannot therefore be regarded as a piece of doctrine among the many, a distinction "un instant évoquée" and "aussitôt abandonnée" by the line of reasoning of the *Meditations*. This distinction is indeed the first to be drawn by Descartes, initially only as a tentative hypothesis, after introducing the concept of idea, and his attempt to establish it in a rigorous way informs, as proven, the entire structure of the work. As a matter of fact, to properly understand Descartes' distinction between factitious, innate and adventitious ideas means to move one step forward in comprehending some of the most critical claims of his entire philosophy.

[§§5-8] Intellectual, Imaginative, Sensory Ideas

The section explores Descartes' distinction between intellectual, imaginative and sensory ideas, also taking advantage of a comparison with the usually related (and already studied) distinction between factitious, innate and adventitious ideas. It shows that the two taxonomies are conceptually distinct, so that innate, factitious and adventitious ideas cannot be taken to be respectively tantamount to the ideas of the pure intellect, of imagination, and of sensibility. Imaginative ideas are the best case in point: §7 documents at length that this class and the class of factitious ideas coincide neither from an extensional nor from an intensional point of view: for Descartes, the ideas of the imagination can indeed be adventitious or factitious, and some factitious ideas are to be ascribed to the understanding. As §5 shows, Descartes understood of the intellect, imagination, and sensibility as different *functions* performed by one the and same cognitive power, either taken by itself or as "applying" itself to the body. The difference between these two modalities of application of the cognitive power is at the basis of Descartes' distinction between intellectual and imaginative ideas, to be studied in §6. §8, on the other hand, sets forth Descartes' criteria for distinguishing between sensory and imaginative ideas, thereby also explaining how Descartes intended to dispel the last remaining doubt of the *Meditations*: the impossibility to tell apart the perceptions of existing objects (sense-perceptions) from dreams (imaginings).

§5. The one *vis cognoscens*, and its different functions

"I am, I exist" inasmuch as I am thinking: as well-known, this is for Descartes the first piece of truth able to withstand all the manifold doubts raised by the *First Meditation*. What am I exactly thinking of, though? As Descartes points out immediately after having discovered the "Archimedean point" of his metaphysics, the experience on this "I" who affirms with unshakable certainty "I am, I exist" is indeed quite diverse. "I am a thinking thing" means indeed for Descartes that I am "something that doubts, affirms, denies, understands a few things, is ignorant of many others, is willing, is unwilling, and which imagines also, and senses", as well as "loves and hates".[1] In order to account for this great variety of mental functions – which are nonetheless said to be functions of *one* mind – Descartes appeals, quite traditionally, to one of the key concepts of Aristotelian psychology: the concept of a faculty (in this case a soul's faculty or, as Descartes would have it, of a faculty of the mind). Descartes was by no means the only thinker of the Early Modern Age who tried to reinterpret this aged but still well-received notion as to make it consonant with his own philosophical views, taking advantage of the widespread Aristotelian parlance to articulate a theory of the mind quite at odds with the model originally presented in the *De anima* and the *Parva naturalia*.[2] The tricky point is, of course, what exactly each of these philosophers meant by "faculty": the Early Modern philosophers' conceptions of this notion prove in fact to differ from one another almost as much as each of them differs from Aristotle's.

Regrettably enough, Descartes does not however say much about the metaphysical nature of these faculties and even less about the more general relation between act and potency, which in the *Meditations* is explicitly addressed only once, and almost in passing, to claim that the existence of a passive faculty demands the existence of a corresponding active one.[3] Not much,

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[1] *Meditationes* III; AT VII 34, 18-21; CSM II 24*. Cf. *Meditationes* II; AT VII 28, 20-22. After the profession of ignorance, the French authorized translation adds "which loves, which hates"; AT IX-1 27. The existential proposition quoted above is to be found in *Ibid.* AT VII 25, 11-13: "hoc pronuntiatum, *Ego sum, ego existo*, quoties a me profertur, vel mente concipitur, necessario esse verum".

[2] On the pervasiveness of the faculty model in the philosophy of the time, see Gary Hatfield, "The Cognitive Faculties" in Daniel Garber – Michael Ayers eds., *The Cambridge History of Seventeenth-Century Philosophy* (Cambridge: Cambridge University Press 1998), II 953–1002. Stephan Schmid, "Early Modern Debates on Faculties" in Dominik Perler ed., *The Faculties: A History* (Oxford - New York: Oxford University Press 2015), 150-97.

[3] Descartes does not even argue for this general (quite too general) claim, but simply takes it for granted and claims that the existence of a faculty to passively receive sensory ideas demands the existence of "an active faculty, either in me or in something else, which produces or makes these ideas"; cf. *Meditationes* VI; AT VII 79, 6-11; CSM II 55.

indeed. Descartes, despite the topic of his main work, was not in fact a *homo metaphysicus* (contrary to Bilfinger's Leibniz), so that his silence over the matter could maybe be explained as a simple lack of interest on his part, possibly because he thought that the Scholastics' understanding of these notions was basically right, so that any reader trained in philosophy would have had no problem to follow his argument.[4] Although this could well be the case, the fact Descartes has not spelled out his theory of the faculties in terms of act and potency can (and, arguably, should) be better understood in quite different terms, namely, as an evidence that Descartes did not consider these notions to be fully adequate to capture and convey his views on the topic.

As the next chapters argue, Descartes did not in fact conceive of understanding, imagining, sensing and the like as the (possible) activations of potentialities inhering in an underlying inert substance, but rather as the manifold *functions* of a thought which is always in act. These functions are admittedly quite a few, and if the mind is always thinking, for Descartes it is not yet constantly undertaking that specific form of thinking traditionally referred to as "imagining" (by way of instance). Still, how Landucci has insightfully pointed out, it is crucial to realize that for Descartes the mind does not, properly speaking, *have* the *faculty to think* but simply *is thinking* – i.e. is "doubting, affirming, denying, imagining, sensing" and so forth.[5] Or, to cast the point in different terms, the mind for Descartes does not *have* the *potentiality to think* (and, accordingly, to think not) but simply *is* the *power of though*, a power which is "actual" without yet having ever been "actualized". The present tense of me being *cogitans* is indeed to be understood in its absolute rigor: I exist *inasmuch as* I am thinking and *as long as* I am thinking, so that I would cease to exist as soon as I would stop thinking.[6] Gassendi had therefore perfectly understood the thrust of Descartes' position when he pointed out that Descartes had been defining the mind "by reference to its action rather than to its faculty".[7] Descartes' understanding of imagination,

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[4] Bilfinger's curious expression can be read in Georg B. Bilfinger, *Dilucidationes philosophicæ de Deo, anima humana, mundo, et generalibus rerum affectionibus* (Tübingen 1725), §74, p. 71; quoted in Vincenzo De Risi, *Geometry and Monadology: Leibniz's* Analysis Situs *and the Philosophy of Space* (Basel: Birkhäuser 2007), 320.

[5] Landucci himself has pointed out that Descartes speaks in these terms only in the *Præfatio* to the *Meditationes*; AT VII 8, 11-12: "res cogitans, sive res habens in se facultatem cogitandi". Cf. Sergio Landucci, *La mente in Cartesio* (Milano: FrancoAngeli 2002), 136. The exception can yet be easily explained by considering that Descartes is here presenting for the first time his alternative conception of the mind to an audience for whom that mind did indeed have such a faculty to think, rather than being always thinking in act. Hence the "aberrant" phrasing.

[6] See (besides the obvious passages from the *Second Meditation*), To X***, August 1641; AT III 423. To Gibieuf, 19 January 1642; AT III 478. To Arnauld, 4 June 1648; AT V 193.

[7] Gassendi, *Disquisitio metaphysica* 129-31 (the passage is quoted by Landucci, *La mente in Cartesio* 137 n. 34).

sensibility and the like changed accordingly. Descartes' "actualism" – the expression is Landucci's – led him in fact to investigate into these faculties first and foremost as the manifold forms taken on by the mind in its uninterrupted activity, in this case too studying them "by reference to their action" rather than in the traditional terms of Aristotelian metaphysics. This is also attested by Descartes' choice in vocabulary, which seems to clearly favor verbal over nominal forms to refer to these "faculties", by speaking for example to "imagining" as such (*imaginari*) and to the mind's "power to imagine" (*vis imaginandi*) rather than to a static *imaginatio*.

Descartes, sure enough, did not cease because of that to speak of "faculties" of the mind, as the most perfunctory look at his works suffices to attest.[8] He warned again and again, though, that these faculties were not to be understood as something distinct from the mind itself, as he took to be the case with the Scholastic conception of the "parts" of the soul. As shown in §2, according to Descartes the Scholastic theory of the faculties suggested in fact a badly misguided picture of the mind, and broke asunder its unity by speaking of alleged "conflicts… between the lower part of the soul, which we call 'sensitive', and its higher or 'rational' part". To which Descartes forcefully objected that *il n'y a en nous qu'une seul âme* and that "this soul has within it no diversity of parts: it is at once sensitive and rational too (*la mesme qui est sensitive, est raisonnable*)".[9] As he criticized Herbert of Cherbury for conceiving of innate ideas as items constantly present to the mind rather than as notions that the mind had the power to understand by its own, likewise Descartes disapproved of his theory of the faculties for suggesting an analogous separation between the mind and its faculties:

> He would have it that we have as many faculties as there are different objects of knowledge. This seems to me like saying that, because some wax can take on an infinite number of shapes, it has an infinite number of faculties for taking them on. In that sense it is true, but such a mode of speech seems to me quite useless, and indeed rather dangerous, since it may give ignorant people occasion to imagine a similar diversity of little entities in our soul. So I prefer to think that the wax, simply by its flexibility, takes on all sorts of shapes, and that the soul acquires all its knowledge by the reflection which it makes either on itself (in the case of intellectual matters) or (in the case of corporeal matters) on the various dispositions of the brain to which it is joined, which may result from the action of the senses or from other causes.[10]

[8] Just to give a few examples from the *Mediationes* alone; *facultas judicandi* (AT VII 32, 53, 54), *facultas ratiocinandi* (AT VII 90), *facultas cognoscendi* (AT VII 56), *facultas errandi* (AT VII 54), not the mention the other faculties mentioned above.

[9] *Passions* I 47; AT XI 364, 17 - 365, 4; CSM I 345-46*.

[10] To Mersenne, 16 October 1639; AT II 598; K 139-40. See above §§3-4 for a detailed analysis of Descartes' view of innatism (the subject will be addressed again from a different perspective at §6).

Descartes had defended the view that understanding, imagining, sensing, remembering and the like are in fact to be understood as nothing but different *functions* and *forms of activity* of the *one*, undivided mind already in his first major philosophical work, the *Rules for the Direction of the Ingenium* – an almost untranslatable term, sometimes misleadingly rendered as "mind", some other, more precisely but no more helpfully, as "native intelligence". He articulated therein his first version of the system of the faculties as follows:

> The power through which we do, properly speaking, know things is purely spiritual (*vim illam, per quam res proprie cognoscimus, esse pure spiritualem*), and is no less distinct from the whole body than blood is distinct from bone, or the hand from the eye. It is one single power (*unica*), whether it receives figures from the common sense at the same time as does the phantasy (*phantasia*), or applies itself to those which are preserved in the memory, or forms new ones which so occupy the imagination (*imaginatio*) that it is often in no position to receive ideas[11] from the common sense at the same time… In all these the cognitive power is sometimes passive, sometimes active (*hæc vis cognoscens interdum patitur, interdum agit*); sometimes resembling a seal, sometimes the wax. But this should be understood merely as an analogy, for nothing quite like this power is to be found in corporeal things. It is one and the same power (*una & eadem est vis*), which, when applying itself along with imagination to the common sense, it is said to see, touch etc. When addressing itself to the imagination alone, in so far as the latter is covered with various figures, it is said to remember. When applying itself to the imagination in order to form new figures, it is said to imagine or conceive (*imaginari vel concipere*). And, lastly, when it acts on its own, it is said to understand (*si denique sola agat, dicitur intelligere*) ... According to its different functions (*juxta has functiones diversas*) the same power is thus called either pure intellect, or imagination, or memory, or sense-perception. But when it forms new ideas in the phantasy, or concentrates on those already formed, the proper term for it is *ingenium*.[12]

Descartes' concept of *ingenium* has recently received much attention among the scholars, especially because of a slightly different and abridged version of the *Rules* recently found in Cambridge by Richard Serjeanston – the so-called *Ur-Regulæ* – which has urged a thorough re-examination of the entire work.[13] Unfortunately since Serjeanston's edition is still under preparation (and, as already pointed out in the introduction to this work, is expected to appear

[11] As already pointed out, in Descartes' writings before the *Meditations* the term does not designate a mental item but a brain impression: in the passage "idea" is indeed used as a perfect synonym of "figure".

[12] *Regulæ* XII; AT X 415, 13 - 416, 10; CSM I 42*.

[13] See the forthcoming *Proceedings* of the conference "Descartes and *Ingenium*" (Cambridge, 14-15 March 2016).

within a few months), a close analysis of the taxonomy of the faculties worked out by Descartes in the 1620s would therefore have to be postponed.

The *Rules* as we know them so far (or, more precisely, the *Twelfth Rule* from which has been taken the passage just quoted, and which is traditionally thought to have been written in 1628), advance at any rate a taxonomy of the mind's faculties which undeniably differs in quite a few points from Descartes' later classifications, starting precisely from *ingenium*, a term which will lose much of its importance – or, at least, most of its highly specialized meaning – after the treatise devoted to its "direction". Over the years, moreover, Descartes became more and more interested in physiology: as he wrote to Mersenne in the winter of 1632, "I am currently dissecting the heads of various animals, so that I can explain what imagination, memory, etc. consist in".[14] He came thereby to abandon the traditional distinction between common sense, phantasy, and imagination as three different (albeit related) portions of the brain ventricles, on which some of the specifics of the *Rules* taxonomy were grounded.[15] The most critical shift pertains nonetheless to the *vis cognoscens*, which in the *Rules* is said to be both active and passive, whereas in the *Meditations* the corresponding *facultas cognoscitiva* is merely passive, all activity being attributed to the willing faculty.[16]

The importance of these shifts in Descartes' theory of the mind cannot be underrated, and one might start wondering whether any piece of doctrine of the *Rules* survived in the *Meditations*, not to say in Descartes' later works. There is however a point which stands apart from whether the *vis cognoscens* is taken to be merely passive or also active, to "apply itself" to different portions of the brain or to nothing but the pineal gland, and apart from whether *ingenium* is singled out as such, or not. The thesis, namely that the cognitive power is "one single power", which performs different functions (for each of which is designated with a different, more specific name) according to whether it applies itself to a bodily organ or not and, in the former case, to which organ and how exactly (how this "application" is to be properly understood is made clear in the next chapter). Despite its manifold functions, Descartes insists that the *vis cognoscens* remains in fact "one and the same" power (*una & eadem vis*), just as *humana sapientia* remains "one and the same (*una & eadem*, again) however different the subject matters to which is applied".[17] By applying itself to one bodily organ or to another, the cognitive power gets specified as a

[14] To Mersenne, November or December 1632; AT I 263; K 40*.

[15] For more on the chronology of the *Rules*, see §24.

[16] As already pointed out in §1. The term *facultas cognoscitiva* – a hapax – shows up in *Meditationes* VI; AT VII 72, 1-2.

[17] *Regulæ* I; AT X 360, 7-10; CSM I 9*: "Nam cum scientiæ omnes nihil aliud sint quam humana sapientia".

certain faculty; by applying itself to a certain domain of objects, cognition (*scientia*) gets specialized in a certain discipline; the cognitive power and its exercise remain yet, as such, unvaried, they being "no more altered by the objects it applies to than sunlight is by the variety of things it shines on".[18]

In the *Meditations*, Descartes also articulates the point from a metaphysical point of view (not so prominent in the *Rules*) arguing that imagining and sensing are "*modes* of thinking" which, accordingly, could not subsist without a thinking *substance* to inhere to. Or, more precisely, without a *substantia intelligens* – a substance, namely, capable of knowing. Descartes insists that the faculties of imagining and sensing are indeed *cognitive* faculties – *viz.* faculties through which the subject, by perceiving things, comes to know them – so that he can speak of "perceptions ou connoissances" as perfect synonyms:[19]

> I find in myself faculties for certain special modes of thinking (*facultates specialibus quibusdam modis cogitandi*), namely the faculties of imagining and sensing. Now I can clearly and distinctly understand myself as a whole without these faculties; but I cannot, conversely, understand these faculties without me, that is, without an intelligent substance they inhere to: these faculties include in fact an intellection in their formal concept (*sine substantia intelligente cui insint: intellectionem enim nonnullam in suo formali conceptu includunt*). I therefore perceive that the faculties of imagining and sensing are distinct from me as a mode is distinct from a substance.[20]

Descartes was thereby implicitly rejecting the Aristotelian theory of the mind, which admitted non-rational sentient beings: beings, namely, provided with nothing but the so-called lower faculties – sensibility and imagination – and yet lacking the understanding, as it was taken to be the case for all non-human animals. Descartes, actually, in the passage seems to go as far as to suggest that, if one is to ascribe a soul to animals, this has in fact to be of the same nature of man's, a claim explicitly endorsed by some Early Modern thinkers, most notably of all by Gómez Pereira in his 1554 *Antoniana Margarita* (on Descartes' theory of animals' mind, see below §20). By claiming that "the faculties of sensing and of understanding cannot be termed 'parts' of the mind, since it is one and the same mind (*una & eadem mens*) … that senses and that

[18] *Ibid.* AT X 360, 10-12; CSM I 9*.

[19] Cf. *Passions* I 17; AT XI 342, 6-22.

[20] *Meditationes* VI; AT VII 78, 21-18; CSM II 54*. *Cogitatio* includes in fact also volitions, whereas here Descartes intends to stress that sensibility and imagination are *cognitive* in nature and involve therefore, more specifically, *intellectio* – i.e. understanding. An analogous shift in *Principia* I 55 (AT VIII-1 32, 1-9), whose title mentions the "modi cognoscendi", whereas the article rightly speaks, in more general terms, of "cogitationum modos", given the fact that Descartes mentions therein also "volitionem", besides "intellectionem, imaginationem, recordationem".

understands",[21] Descartes did not therefore intend to argue only against some specific versions of the Scholastic psychology, but against the Aristotelian theory of the mind in its entirety. Although arguably inspired by Aquinas' and analogous criticism of any "pluralist" conceptions of the soul, Descartes had brought the quite traditional claim that the soul has no part to conclusions that virtually no Aristotelians would have ever been ready to endorse.[22] Not even the most resolute supporters of the unity of the soul had in fact ever gone so far as to affirm that the different faculties of the soul *essentially* involve the understanding in their very definition.[23] It was indeed precisely because he thought to have established that all faculties of the mind "presuppose intellection" that Descartes concluded that the faculty of bringing about adventitious ideas (the *facultas istarum idearum effectrix* discussed in §2) was not and could not be a faculty of the mind.[24]

Descartes' model of the mind was in fact Neoplatonic rather than Aristotelian in inspiration, as appears especially evident from his theory of the imagination, which seems to have been inspired by Proclus' *Commentary on the First Book of Euclid's* Elements – although (as argued by Rabouin) possibly only indirectly, via Kepler's *Harmonices mundi* (1619).[25] Descartes,

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[21] *Meditationes* VI; AT VII 86, 6-10; CSM II 59*. Cf. *Principia* I 54; AT VIII-1 31, 14-15: "una & eadem mens plures diversas cogitationes habere potest".

[22] On Aquinas' metaphysical premises and epistemological consequences of the claim that the soul has no part, see Dominik Perler, "Rational Seeing: Thomas Aquinas on Human Perception" in Elena Baltuta ed., *Theories of Sense-Perception in the 13th and 14th Centuries* (forthcoming).

[23] On the Scholastic theory of the "parts" of the soul see Dominik Perler, "The Soul and its Parts" in Andrew Arlig ed., *Medieval Mereology* (forthcoming). Id., "How Many Souls Do I Have? Late Aristotelian Debates on the Plurality of Faculties" in Russel Friedman – Jean-Michel Counet eds., *Medieval Perspectives on Aristotle's* De anima (Louvain: Peeters 2013), 277-96. On Descartes' argument for rejecting "pluralist" accounts of the soul, see Steven J. Wagner, "Descartes on the Parts of the Soul", *Philosophy and Phenomenological Research* 45/1 (1984): 51-70.

[24] *Meditationes* VI; AT VII 79, 6-14; CSM II 55: "hæc [facultas] sane in me ipso esse non potest, quia nulla plane intellectionem præsupponit".

[25] Cf. David Rabouin, "Le role de Proclus dans les débats sur la 'mathématique universelle' à la Renaissance" in Alain Lernould ed., *Etudes sur le commentaire de Proclus au premier livre des* Elements *de Euclide* (Paris: Presses Universitaires du Septentrion 2010), 217-34. See, of the same author, *Mathesis Universalis: L'idée de "mathématique universelle" d'Aristote à Descartes* (Paris: Presses Universitaires de France 2009), in particular 304-18. More recently, Hattab argued for an influence of Proclus also on other pieces of Descartes' philosophy of mathematics, starting from his theory of universals; cf. Helen Hattab, "Descartes on the Eternal Truths and Essences of Mathematics: An Alternative Reading", *Vivarium* 54 (2016): 204-49. On Proclus' influence of Kepler, see Guy Claessens, "Imagination as Self-knowledge: Kepler on Proclus' *Commentary on the First Book of Euclid's* Elements", *Early Science and Medicine* 16 (2011): 179-99. On the issue see, more in general, Lawrence Nolan, "The role of the imagination in

indeed, understood of the faculties of the mind as the different *functions* performed by one the and same cognitive power in relation to different bodily organs (in the *Rules*), or in relation to the different ways of behaving of one specific organ – the pineal gland – which, as already remarked, from the 1630s onwards took over the functions as well as the names of three previously distinct organs: common sense, phantasy, and imagination.[26] Descartes, accordingly, also designated imagination as "the operation of the imagining mind" (*operatio mentis imaginantis*) or, as he spells it out, as the mind insofar as it directs itself to the impressions on the pineal gland (i.e. on the imagination, this time understood as an organ), trying to make as clear as possible that for him it was not the imagination to imagine, nor the understanding to understand, but one and the same mind differently directed to perform both actions.[27] Descartes, analogously, identified the intellect with the cognitive power not applying itself to any corporeal organ, what he sometimes also qualified as "l'entendement pur" or "l'entendement seul": alone and pure precisely because not dealing with the body.[28] Accordingly, Descartes claimed that "obviously the brain can be of no use in purely understanding, but only in imagining and sensing".[29]

It is thus straightforward to explain why by *intellectus* and *entendement* Descartes sometimes referred to the cognitive power as a whole, rather than to one of its specific function, the highest one: taken by itself, apart from the body, the cognitive power is indeed nothing but the intellect. For Descartes, the *vis cognoscens* and the body are in fact entities of different sorts, "the power through which we do, properly speaking, know things… being no less distinct from the whole body than the hand is distinct from the eye": Descartes made in fact crystal-clear that the *vis cognoscens* is "purely spiritual", a claim that is already resolutely going in the direction of the dualism of the *Meditations* (if is not to be taken as its germinal formulation).[30] The intellect,

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rationalist philosophies of mathematics" in Alan Nelson ed., *A Companion to Rationalism* (Oxford: Blackwell 2005), 224-49.

[26] Cf. *Homme*; AT XI 174, 9-10; Hall 83. *Meditationes* VI; AT VII 86, 16-23. On the concept of mental functions, see also *Passions* I 17 (*Quelles sont les fonctions de l'âme*); AT XI 342, 6-22. In what follows, unless otherwise stated, "faculties" will always refer to the non-volitional faculties of the mind, i.e. to the faculties of the mind *qua* passive: intellect, imagination, and sensibility (memory too belonging to this class).

[27] To Mersenne, 21 April 1641; AT VII 361; K 180*.

[28] See for example To Elisabeth, 28 June 1643; AT III 691. *Notæ in Programma*; AT VIII-2 363, 22-24; CSM II 307: "pure understanding (*intellectio pura*), that is, an understanding that is not concerned with physical images".

[29] *Responsiones* V; AT VII 358, 19-21; CSM II 248*: "nam sane nullus cerebri usus esse potest ad pure intelligendum, sed tantùm ad imaginandum vel sentiendum".

[30] See also *Regulæ* XII; AT X 422, 1: "intelligo, ergo mentem habeo à corpore distinctam".

therefore, cannot be regarded for Descartes as one cognitive function among the many, on a par with imagining and the like. Properly speaking, it is indeed only when the *vis cognoscens* turns to the body that a variety of cognitive functions – and, accordingly, of faculties – come into being. *Intellectus* and its French equivalent should therefore sometimes be translated as "understanding" when intended to refer to the *vis cognoscens* as a whole (as when Descartes writes that "le sentiment de la douleur… n'est que dans l'entendement"),[31] some other by "intellect", as when Descartes opposes it to imagination and sensibility. Accordingly, "the pure understanding", "the understanding alone" and "the intellect" coincide.

In the light of what has been said so far is thus straightforward to make sense of the definition of the "faculty of imagining" to be read in the *Meditations*, which testifies Descartes' adherence still in the 1640s to the model of the mind he had started working out more than ten years before:

> Imagination *seems* to be nothing else but the application of the knowing faculty (*facultas cognoscitiva*) to a body to which this power is intimately present, and which therefore exists… And I clearly understand that, in case there does exist some body to which the mind is so conjoined that it can voluntarily (*pro arbitrio*) apply itself to, so to say, "contemplate" it, then it may possibly be that it is because of this body that I imagine corporeal things. So that this mode of thinking *would differ* from pure understanding only in this: that the mind, in understanding, in some way turns toward itself and inspects one of the ideas that are within it. When it imagines, on the other hand, the mind turns toward the body and looks at something in it which conforms to an idea either understood by the mind or perceived by the senses.[32]

The reason why Descartes introduced this definition only as a hypothesis was not because he started to doubt of this theory at the time he was penning down the *Meditations*, but only because the doubts raised in the *First Meditation*, which had called into question the existence of material objects had not been dispelled at the moment Descartes was trying to explain what imagination amounted to. The different faculties of the mind could therefore no longer been distinguished on the basis of the different portions of the brain the cognitive power would apply itself to: it was indeed doubtful that such a body was there at all.

Descartes, however, did not thereby intend to deny that the "I" which the *cogito* argument of the *Second Meditation* had proven to exist with unshakable certainty had a fairly multifarious experience. As already pointed out, the *Third Meditation* opens in fact by declaring that

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[31] To Mersenne, 11 June 1640; AT III 85; K 148.

[32] *Meditationes* VI; AT VII 71, 23 - 72, 3; 73, 10-20; CSM II 50-51* (emphases added). Referred to as the *imaginandi facultas* just a few lines before.

> I am a thinking thing: that is, a thing that doubts, affirms, denies, understands a few things, is ignorant of many others, is willing, is unwilling, and which imagines also, and senses… Even though what I sense or I imagine does not perhaps exist outside me, nonetheless I am certain that the modes of thinking which I refer to as sensations and imaginings, insofar as they are nothing but certain modes of thinking (*quatenus cogitandi quidam modi tantum sunt*), are certainly in me. [33]

No doubt concerning the existence of an external world can in fact call into question this phenomenological evidence:

> And it is still me to imagine. For even if, as I have supposed, no object of the imagination (*res imaginata*) is real, the power of imagining as such (*vis ipsa imaginandi*) exists for real <in me>, and belongs to my thinking. And it is always me to sense, that is, to experience corporeal objects as it were through the senses. For example, I am now seeing light, hearing a noise, feeling heat. But this is all false: as a matter of fact, I am asleep. Yet I certainly *seem* to see (*videre videor*), to hear, and to be warmed. This cannot be false and this is what is properly called "to sense", as far as I am concerned (*quod in me sentire appellatur*). And "to sense", taken in this strict sense, is nothing but "to think" (*cogitare*).[34]

One should be very cautious here, though. Since Descartes thought that sensibility and imagination are distinct faculties and would conclude the *Meditations* by establishing this claim, he kept in fact on distinguishing between the two throughout most of the work, even when he would not always have been entitled to. Descartes maintained that "I imagine quantity… or the extension of an object endowed with a quantity in length, breadth, and depth. I also enumerate various parts in this object, and to these parts I assign various sizes, shapes, positions and local motions", and that "I also imagine many other things… such as colors, sounds, tastes".[35] But also as far as the sense-perception of (alleged) external objects is concerned, "in addition to the extension, shapes and movements of bodies, I also sense in them hardness and heat, and the other tactile qualities. And in addition to them also light and colors, and smells, and tastes, and sounds".[36] Descartes warned indeed the reader in many occasions that, taken by themselves, a sense-perceiving and an imagining are indistinguishable. As a matter of fact, this was what the

[33] *Meditationes* III; AT VII 34, 18 - 35, 21; CSM II 24-25*.

[34] *Meditationes* II; AT VII 29, 7-18; CSM II 19*. The qualifying expression in angle brackets is taken from the French translation; cf. AT IX-1 23.

[35] *Meditationes* V; AT VII 63, 16-21; CSM II 44*. *Meditationes* VI; AT VII 74, 1-3; CSM II 51*.

[36] *Ibid.* AT VII 74, 28 - 75, 3; CSM II 52*.

dream argument of the *First Meditation* was entirely about, as repeatedly pointed out by Descartes.[37]

The distinction between imagination and sensibility is properly addressed only in the *Sixth Meditations*, whereas in the former states of the argument Descartes could only *take it for granted* by appealing to received wisdom. When, in the *Second Mediation*, Descartes touched upon the interplay of these two faculties and the pure intellect in perceiving a material object (in Descartes' example, a piece of wax) he himself had pointed out in fact that he would not have been entitled to take up the issue at that stage of the enquiry.[38] The *Rules* too, actually, presented the matter as a mere "assumption", although by that Descartes only meant that, for the time being, he did not intend to undertake a rigorous demonstration of this claim.[39] The *Meditations*, on the other hand, must set forth a proof of Descartes' taxonomy of the faculties and, more specifically, of the distinction between imagination and sensibility called into question by the dream argument. Before this distinction has been established it would therefore be more appropriate to speak of "imaginative-sensory" ideas, as opposed to intellectual ones or, as Descartes also called them, to the "pure intellections" (*intellectiones puræ*).[40]

The claim that the concept of triangle does not present itself to the mind as a three-sided figure drawn on paper or envisaged while asleep (the latter two being undistinguishable as long as the dream argument is in force) sounds reasonable. The point is yet to spell out what this difference consists in. Descartes claims that these ideas – which will turn out to be the ideas of imagination, and of sensibility, as distinct faculties – have an *image-like character* that is missing in the case of intellectual ones, and that is precisely by virtue of this that Descartes could single

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[37] See *Meditationes* I; AT VII 19, 8-22, especially 19-21; CSM II 13: "As I think about this more carefully, I see plainly that there are never any sure signs (*certis indiciis*) by means of which being awake can be distinguished from being asleep". The argument is succinctly repeated in *Meditationes* VI; AT VII 77, 7-14; CSM II 53: "Every sensory experience I have ever thought I was having while awake I can also think of myself as sometimes having while asleep. And since I do not believe that what I seem to perceive in sleep comes from things located outside me, I did not see why I should be any more inclined to believe this of what I think I perceive while awake".

[38] Cf. *Meditationes* II; AT VII 29, 28 - 30, 2; CSM II 20.

[39] As a matter of fact, the long passage from the *Twelfth Rule* quoted at the beginning of this chapter is opened – like most of the most important claims of that text – by the clause "concipiendum est", to be rendered as something like "let us conceive of the matter in the following way" (AT X 415, 13; cf. CSM I 40). Some scholars have accordingly argued that in the *Rules* Descartes was studiously adopting a purely "methodological stance", as opposed to being making metaphysical claims. I resist this reading in §26.

[40] The expression is suggested by Arnauld and readily accepted by Descartes; cf. From Arnauld, 3 June 1648; AT V 187. To Arnauld, 4 June 1648; AT V 192. From Arnauld, July 1648; AT V 212-13.

out imagining and sensing as "certain special modes of thinking".[41] Descartes, unfortunately, only touched upon the issue and the longest discussion of the topic, to be read in the *Sixth Meditation*, proves largely inadequate, based as it seems to be on nothing but a metaphor about "the eye of the mind" which would be "so to say, contemplating" a brain impression. And since this brain impression is indeed quite literally an image, the resulting idea presents an image-like character, "for imagining is simply contemplating the figure, or image, of a corporeal thing" (see the next chapter for a detailed analysis of these claims).[42] In the case of sense-perception Descartes added the proviso that this brain impression must have been caused by a stimulation of the sense-organs but in this case too, at the bottom level, what the mind is confronted with is an impression on the pineal gland to which the mind is said to be "intimately present". It can thus be easily explained why intellectual ideas do not present an image-like character: according to Descartes, intellectual ideas do not depend on any brain impression. For Descartes, to cast the issue in Aristotelian terms, the intellect requires in fact no *phantasma* in order to perform its operations, hence the thesis that "the brain cannot in any way be employed to purely conceive (*pure intelligendum*), but only in imagining and sensing".[43]

It is precisely because Descartes always kept on thinking of the relation between the different faculties from the point of view of physiology that he failed to provide an adequate treatment of the phenomenological differences between intellectual, imaginative and sensory ideas. The doubts raised by the *First Meditation* required him to adopt such a stance, and to set aside all empirically-informed considerations to take into account nothing but ideas, whose objects could hypothetically not be proven to exist or, in the worst scenario, be proven to exist not. Descartes did his best to comply painstakingly with the method of enquiry he had set for himself, and to a large extend he succeeded in doing this, despite the fact his theory of the faculties did not always prove itself equal to the task. Without knowing in advance Descartes' theory of the imagination as spelled out in the *Rules* and in the *Treatise on Man*, it would however be quite hard to make sense of the inference from the *difference* between the intellectual and the imaginative idea of a triangle to the *existence* of a body to which the mind would be conjoined

[41] From the already quoted *Meditationes* VI; AT VII 78, 21-22; CSM II 54. Descartes, accordingly, illustrates the relation between sense-perceptions and imaginings by appealing to an articulated comparison with paintings; cf. *Meditationes* I; AT VII 19, 23 - 20, 19. Descartes describes imaginings as "l'ombre et la peinture" of sense-perceptions also in *Passions* I 21; AT XI 345, 13-14:

[42] *Meditationes* II; AT VII 28, 4-5; CSM 19*: "nihil aliud est imaginari quàm rei corporeæ figuram, seu imaginem, contemplari".

[43] Cf. *Responsiones* V; AT VII 358, 19-21; CSM II 248*.

(although it must be said, to Descartes' merit, that he himself acknowledged that this inference was not fully cogent).

In the *Meditations*, Descartes did not in fact investigate the distinction between the cognitive faculties for its own sake. As it has already proven to be the case for the distinction between factitious, innate and adventitious ideas, phenomenology has never been pursued by Descartes in its own right, but always put at the service of metaphysics. The reason why Descartes moved from the pure understanding to considering the lower faculties of the mind was indeed primarily to prove "the existence of material things, and the real distinction between mind and body". So reads the title of the *Sixth Meditations*, which opens precisely by "severing the intellect from the imagination, and describing the marks that distinguish the two"[44] and concludes by explaining how to distinguish sense-perceptions from imaginings. As a matter of fact, in the *Meditations* Descartes' presentation of the theory of the faculties is largely consequent to and almost parasitic on the proof that material objects exist.

As convincingly argued, Descartes' argument for the existence of material objects progresses indeed precisely according to the system of the faculties. The investigation into the idea of material objects of the pure understanding was thus supposed by Descartes to prove that their existence is *possible*; the phenomenology of the imagination that is *probable*; "la présence en moi du sentiment" that is *certain*.[45] Gueroult's is indeed an elegant reading, and a faithful reconstruction of Descartes' argument, provided that the ideas of the intellect, imagination, and sensibility are not surreptitiously taken to correspond, respectively, to innate, factitious and adventitious ideas.[46] The following §7 and §8 substantiate this claim by proving that for Descartes not all factitious ideas are in fact ideas of the imagination, and that not all imagination's ideas are factitious: the scheme to be found at the end of the chapter gives a clear overview of how the two taxonomies do actually relate (or, at least, of how I take them to relate).

Descartes was not trying to prove that material objects exist by first considering the ideas of the imagination, which are factitious, to then move to the ideas of the senses, which are adventitious, as if the distinction between imagination and sensibility had already been established and the distinction between factitious, innate and ideas could be straightforwardly mapped onto the system of the faculties. Descartes' proof that material objects exist takes in

[44] *Meditationes*, *Synopsis*; AT VII 15, 20-22; CSM II 11*.

[45] Cf. Martial Gueroult, *Descartes selon l'ordre des raisons*, II 7.

[46] *Ibid.* II 22-41. This misunderstanding is not only Gueroult's, although he was arguably instrumental in making it take hold.

fact as its object of enquiry a class of ideas where no distinction between imaginings and sense-perceptions can initially be made. Descartes' proof that material objects exist proceeds thus from considering *image-like factitious ideas* to consider *image-like adventitious ideas*. Descartes moves accordingly from investigating the subject's power to voluntarily (*pro arbitrio*) *bring about* image-like ideas to then move, as the first investigation turned out to be inconclusive, to the subject's power to passively *receive* ideas of this sort.

The faculty to form image-like ideas is indeed, for Descartes, the imagination. If the imagination were nothing but this, the dream argument could however be rejected right away, since the subject would have nothing to do but asking himself whether he had brought about an image-like idea or not, in order to distinguish between imaginings and sense-perceptions. This, however, is clearly not the case. As Descartes remarks in the *Second Meditation*, the subject happens in fact to "imagine many things even against his will (*invitus*)".[47] For Descartes, some of the imagination's ideas are in fact adventitious – dreams, for example, and daydreaming, and hallucinations. It must indeed be noted that Descartes' tentative definition of the imagination quoted above by no means defines imagination as the faculty of factitious ideas.

Descartes maintains that the bodily impressions to which the cognitive power is said to apply itself to in imagining can in fact be formed in two ways: (i) as a result of a free decision of the subject to imagine something, a decision that results in the formation of a brain impression in conformity to the subject's intellectual idea of this thing. Or, (ii) by the flow of the spirits which are said to permeate the brain cavity wherein the gland is located, which is how according to Descartes dreams and daydreaming are formed.[48]. According to Descartes both (i) and (ii) count as instances of imaginings – voluntary the former, unintended the latter.

As turns out to be the case once the entire physiology and theory of perception is in force, in Descartes' philosophy imaginings correspond in fact to the ideas caused by impressions on the gland which *do not have a nervous stimulation as their cause*, might they have been brought about (i) by the mind, or (ii) by the spirits. According to Descartes, what qualifies them as "imaginings" is in fact their being *non-sensory*, that is, the fact they do not (directly) result from a stimulation induced by the external object and transmitted to the brain by the nerves.[49] Both (i) and (ii) are

[47] *Meditationes* II; AT VII 28, 27-28; CSM II 19. Cf. *Passions* I 21; AT XI 344, 15 - 345, 15. The theory is discussed in detail in §8.

[48] *Meditationes* VI; AT VII 89, 20 - 90, 6. The claim that dreams and akin phenomena (such as daydreaming and hallucinations) had to do with the imagination was a well-established thesis at Descartes' time, supported by all Aristotelians. The details of Descartes' physiology are studied in §24.

[49] The clearest formulation of this point is maybe to be read in *Passions* I 20-21; AT XI 344, 1 - 345, 5 (to be analyzed in §8).

indeed caused for Descartes by nothing but an impression on the gland – i.e. on the organ of the imagination – to which the cognitive power is "intimately joined" and to which is said to "apply itself to", and this is what qualified them both as imaginings. Following received theories and, at the same time, using a metaphor that Leibniz was later to turn against him, Descartes is said to have argued that

> the difference between perception and imagination is… that in perception the images are imprinted [on the brain] by external objects which are actually present, whilst in imagination the images are imprinted by the mind without any external objects, and with the windows shut, as it were.[50]

As Descartes argued at length in his physiological writings and as he expressly points out in the *Sixth Meditation*, the same is however also the case with the impressions resulting from the random motions of the spirits, in this case too images being formed on the gland apart from any stimulus coming from the outside, *tanquam clausis fenestris*.[51]

For Descartes, however, an impression gets formed on the brain in the case of sense-perception too. As already pointed out, the specific portion of the brain to which the cognitive power applies itself is indeed for Descartes at the same time the imagination and the common sense – both understood as bodily organs, of course, not as faculties of the mind.[52] Descartes thought he had in fact a convincing physiological explanation of the reason why factitious imaginings, adventitious imaginings and adventitious sense-perceptions *look* the same (or, to use a concept already introduced in §0, why they have the same *presentational* or *aspectual character*): because they all were caused by an analogous impression on the pineal gland – i.e. on the imagination; i.e. on the common sense – either caused: (i) by the mind itself; (ii) by the random flow of the spirits; or (iii) by a stimulus coming from the nerves.

It must indeed be noticed that Descartes defined sense-perception precisely as the class of ideas resulting from a neural stimulation, arguing that "the wide variety in sensations is a result,

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[50] *Conversation with Burman*; AT V 162; K 345. One does not need to appeal to Burman's sloppiness in order to explain why imagination is here presented by Descartes only as the power to voluntarily bring about image-like ideas: he was in fact commenting specifically on the opening pages of the *Meditations*, where imagination is indeed initially considered only under this specific regard. As is straightforward to realize this cannot however be Descartes' full account, since neither sensibility nor imagination so defined could account for dreams and like experiences, which do yet clearly play a paramount role in the reasoning of the *Meditations* and to which Descartes devoted some much attention in his physiological writings. Descartes' theory of the imagination is indeed way more sophisticated than his reported exchange with Burman would seem to suggest.

[51] *Meditationes* VI; AT VII 89, 20 - 90, 6. See §8 for further references.

[52] In the *Treatise on Man* Descartes describes the pineal gland as "the place (*lieu*) destined for imagination *and* for common sense"; cf. *Homme*; AT XI 174, 9-10; Hall 83 (emphasis added).

firstly, of the differences in the nerves themselves and, secondly, of the differences in the sort of motions occurring in particular nerves".[53] Following this definition, Descartes broadened the concept of sense-perception as to encompass not only the five standard *external* senses but also passions and natural appetites (such as hunger and thirst) – which no one before him had ever regarded as senses of any sort. Many philosophers before Descartes had admittedly already introduced a few internal senses beyond sight and touch, hearing, smell and taste, in order to account for the perception of external bodies and some other psychological facts such as dreams and recollection, and Descartes, indeed, admitted most of the received internal senses in his own philosophy, which abounds in reflections about the common sense, imagination and memory. He did not refer to the them as the *internal senses*, though, a term that he reserved for passions and natural appetites, only these classes of ideas – together, of course, with the ideas of the five external senses – being caused for Descartes by a stimulation coming from the nerves.[54] (In what follows, however, unless otherwise stated "sense-perceptions" do nonetheless always refer to *external* sensations only, usually exemplified by color-perceptions).

Descartes, in the *Meditations*, takes great pains to draw a distinction between (i), (ii), and (iii), ideas all resulting from identical brain impressions, albeit differently caused. In this work, Descartes could not in fact rely on any criterion along the lines of *Rules* in order to tell them apart: any physiological remark was indeed simply beside the point as long as the existence of material objects (brain and nerves and spirits included) was still under doubt. Descartes could not even simply appeal to their *aspectual character*, by virtue of which he had told them apart from the ideas of the pure understanding: under this regard alone (i), (ii) and (iii) are indeed undistinguishable. Descartes turned thus to considering whether the place in the timeline of thoughts and the representative content of an imaginative-sensory idea could be freely modified by the subject, or not, thereby succeeding in discriminating between (i) the class of *factitious imaginative* ideas and (ii)-(iii) the class of *adventitious imaginative-sensory* ideas: (i) can in fact be easily singled out inasmuch as, having been voluntarily produced by the subject, the subject knows that he himself is the cause of like an imagining, whereas (ii) and (iii) are both adventitious ideas which, as the dream argument has shown, present themselves precisely in the same way. In order to distinguish between (ii) adventitious imaginative ideas and (iii) sensory ideas – that is, between dream-experiences and sense-perceptions – Descartes had therefore to find out some other, more stringent criterion. He moved thus from observing that the order in which ideas of this sort follow each other in experience cannot be established by the subject himself, to study the

[53] *Principia* IV 190; AT VIII-1 316, 12-14; CSM I 280*. For more on the issue see §25.

[54] The most detailed treatment of the matter is to be read in the *Homme*; AT X 163, 6 - 170, 2; Hall 68-76.

order of experience itself. As explained in §8, for Descartes some adventitious ideas happen indeed to follow from the previous ones in an *orderly succession*, whereas some others pop up randomly, and it is on this base that he thinks that sense-perceptions and dreams (and, more in general, the adventitious ideas of the imagination) can be finally told apart.

As this simple overview of Descartes' line of reasoning suffices to show, the argument of the *Meditations* is indeed quite elaborated and based on a few very subtle distinctions. Spelling out its different stages is the task of the chapters that follow.

§6. Intellectual *vs.* imaginative ideas

The *Sixth Meditation* does not therefore open by investigating for its own sake the relation between the intellect and the imagination in general (as responsible for both factitious and adventitious imaginings), but studies the relation between the pure understanding and the faculty of making image-like ideas, and this too not so much in its own right, as to establish the existence of material objects. As Descartes' line of reasoning makes clear, in this portion of the text the intellect too is not in fact considered in general but, more specifically, as the faculty of grasping innate ideas, disregarding for the time being its capacity to devise new notions (as the next chapter proves to be the case for the notion of a deceiving God), as well as the involuntary recurrence to the mind of abstract thoughts it had already entertained – the "habitual opinions that keep coming back... against my wishes", which should apparently count as instanced of *adventitious intellectual ideas*.[1] In the *Sixth Meditation*, Descartes in fact simply states that the mind, in understanding, "inspects one of the ideas that are within it" (*respiciat aliquam ex ideis quæ illi ipsi insunt*), clearly referring to inborn notions rather than to non-imaginative-sensory ideas in general.[2] Actually, Descartes is not even looking here at the intellect as at the faculty of grasping innate ideas in general but, even more specifically, as the power to grasp the (innate) notions of geometrical figures. As a matter of fact, the *Meditation* that immediately precedes investigated the nature of innate ideas by studying exactly the ideas of geometrical figures. The reason why

[1] *Meditationes* I; AT VII 22, 4-7; CSM II 15*. Descartes, admittedly, does not speak expressly of *intellectual adventitious* ideas. The term should not be taken to be contradictory, though. As the meditating subject observes in the *First Meditation* while reviewing his former believes, "whatever I have up till now accepted as most true I have acquired either *from* the sense or *through* the senses (vel *a* sensibus, vel *per* sensus accepi)"; AT VII 18, 15-26; CSM II 17 (emphases added). Descartes is said to have be glossed the passage as follows: "*From the senses*: i.e. from sight, by which I have perceived colors, shapes, and such like. Leaving aside sight, however, I have acquired everything else *through the senses*, i.e. through hearing; for this is how I acquired and gleaned what I know, from my parents, teachers, and others. The objection cannot be made here that this leaves out the common principles and ideas of God and of ourselves, which were never in the senses. For, firstly, I acquired these in the same way, through the senses, that is to say, through hearing…"; *Conversation with Burman*; AT V 146; K 332. Teachings of this sort – to which belongs also the "inveterate belief" of an omnipotent God, always mentioned in the *First Meditation* (21, 1-3) – do indeed come to the subject from the outside, namely, from material objects (human bodies, or books) which convey abstract notions. They are, indeed, intellectual adventitious ideas. Descartes' account of memory (as it will be made clear at the end of the chapter) is quite thorny, especially as for intellectual memory, but the passage mentioned above suggests that also recollections of these teachings – as well as of the subject's previous thoughts – should fall into this same class.

[2] Cf. *Meditationes* VI; AT VII 73, 16-17; CSM II 51.

Descartes focuses specifically on this class of innate ideas is not their exemplary value, though, but the demonstration he is after: proving that material objects exist.

Of the manifold properties usually ascribed to material objects, Descartes claims that there are in fact a few of which we do have an innate understanding, so that he can speak of a "corporeal nature which is the subject-matter of pure mathematics" (*natura corporea, quæ est puræ Matheseos objectum*) or, as glossed in the French version, of a "corporeal nature [that] can serve as the object of geometrical demonstrations, which have no concern with whether that objects exist".[3] It is exactly for this reason, Descartes made clear, that mathematical demonstrations are not affected by the dream argument (which calls into question the distinction between sense-perceptions and imaginings) and not even by the hypothesis that there are no bodies at all, according to which the apparent world could ultimately turn out to be nothing but the delusive creation of an unknown *facultas effectrix* of the mind.[4] For Descartes, indeed, no one but God can cast doubts on the validity of mathematical statements (or, at least, only a god-like entity such as the "deceiving demon"). However, once the possibility of God being a deceiver has been ruled out, Descartes can take his clue precisely from these geometrical notions to conclude that "material objects… insofar as they are the subject-matter of pure mathematics, *can* exist, since I perceive them clearly and distinctly". Or, to make the concluding clause explicit, since the ideas of geometrical objects, having been proven to be innate (on a par with the idea of the I and of God) "have true and immutable natures", these geometrical objects must be capable of existing also "outside my thought" – *extra cogitationem meam*.[5]

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[3] *Ibid.* AT VII 71, 14-16; CSM II 50* (emphasis added). *Meditationes* V; AT VII 71, 8-9; CSM II 49. The expression *puræ Matheseos objectum*, which basically concludes the *Fifth Meditation*, recurs also a few lines later, at the very outset of the *Sixth* (AT VII 71, 15), thus making crystal-clear the progression of Descartes' argument. Cf. David R. Lachterman, "*Objectum Purae Matheseos*: Mathematic Construction and the Passage from Essence to Existence" in Amélie Oksenberg Rorty ed., *Essays on Descartes'* Meditations (Berkeley - Los Angeles - London: University of California Press 1986), 435-58. For the French text, see *Meditations* V; AT IX-1 56; CSM II 49.

[4] Cf. *Meditationes* I; AT VII 20, 20-30; CSM II 14*: "So a reasonable conclusion from this might be that physics, astronomy, medicine, and all other disciplines which depend on the study of composite things, are doubtful; while arithmetic, geometry and other subjects of this kind, which deal only with the simplest and most general things, and do not care much whether these things exist for real, or not (*utrum eae sint in rerum natura necne, parum curant*), contain something certain and indubitable. For whether I am awake or asleep, two and three added together are five, and a square was no more than four sides". See along the same lines, *Conversation with Burman* (AT V 160), where Descartes is reported to have drawn in important distinction between *ens verum et reale*, *ens actu et quâ tale existens* and *ens possibile*.

[5] *Meditationes* V; AT VII 64, 6-24; CSM II 44-45. Cf. To Mersenne, 16 June 1641; AT III 383; K 183: "others [ideas] are innate, such as the idea of God, mind, *body*, triangle, and in general all those which represent true, immutable

By appealing to the ideas of the pure understanding Descartes thinks thus to have established the *possibility* for material objects *qua geometrical objects* to exist, restricting the claim to the properties of material objects of which (according to Descartes) we have an innate intellectual idea. Descartes, actually, has never spoken of "innate intellectual ideas", but this is only because he took the latter qualification to be completely redundant: for Descartes, *all* innate ideas are in fact ideas of the pure understanding. Contrary to what happens to be the case with adventitious ideas, innate ideas are and can indeed be perceived by the understanding alone (as the next chapter makes clear, according to Descartes not *all* intellectual ideas are on the other hand innate).[6] As a matter of fact, in Descartes' views innate ideas "derive from nothing else but my nature", and this is why I can think of them whenever I please (*ad arbitrium*).[7] The "I" from which alone these ideas are said to derive is of course the mind, whose nature consists in thinking, and that is why all innate ideas are ideas of the pure understanding. Descartes maintains in fact to have positively established that the faculties of imagination and sensibility are not essential to the mind, which can be understood and can subsist apart from them.[8] As

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and eternal essences" (emphasis added). As Descartes points out, "these is no doubt that God is capable of creating everything that I am capable of perceiving clearly and distinctly; and I have never judged that something could not be made by God except on the grounds that there would be a contradiction in my perceiving it distinctly (*nisi propter hoc quod illud a me distincte percipi repugnaret*)"; *Meditationes* VI; AT VII 71, 16-20; CSM II 50*. Cf. AT IX-1 57: "qu'alors que ie trouvois de la contradiction à la pouvoir bien concevoir". For Descartes, therefore, for the physical existence of an object to be possible it suffices that the notion of this object is non-contradictory. Descartes is thereby denying any distinction between *logical* and *physical* possibility, a distinction which will play a paramount role in Kant's refutation of Descartes' argument for the existence of God. On the topic, see Emanuela Scribano, *L'esistenza di Dio: Storia della prova ontologica da Descartes a Kant* (Roma - Bari: Laterza 1994).

[6] Cf. *Annotationes*; AT XI 655: "Innate ideas differ from adventitious ideas, as well as from made – or fictitious – ones, insofar as an action of the will contributes to fictitious ideas, to the adventitious ones the senses, to innate ideas only the perception of the intellect". Cf. *Epistola ad Voetium*, May 1643; AT VIII-2 166, 21-25; K 222: "all those things whose knowledge is said to be naturally implanted in us (*à naturâ indita*) are not for that reason expressly known by us; they are merely such that we come to know them by the power of our own native intelligence, without any sensory experience (*absque ullo sensuum experimento, ex proprii ingenii viribus*)". Descartes is here speaking of an *ingenium* rather than of the *vis cognoscens* in its purity – i.e. of the intellect – precisely to stress that some notions are inborn and, so to say, "congenital" to the disembodied mind rather than acquired through the senses; cf. *Meditationes* V; AT VII 68, 8-9: "ideas veras mihi ingenitas". In the *Synopsis* to the work, by the same token, Descartes speaks of the mind and of God as "the most certain and evident notions that can be known by the human *ingenium*"; cf. AT VII 16, 3-7; CSM II 11*.

[7] *Meditationes* V; AT VII 64, 10. Cf. *Meditationes* III; AT VII 38, 3-4: "non aliunde habeo quàm ab ipsâmet meâ naturâ". See §3 for a more detailed analysis of Descartes' conception of innatism".

[8] See the already discussed *Meditationes* VI; AT VII 78, 21-18.

Descartes labors to prove precisely in the *Sixth Meditation*, the mind is *not* indeed conjoined *by essence* with a body, while is only by applying itself to such a body that the one cognitive power gets specified as the faculty of imagining and of sensing. Therefore, any idea resulting from a physiological stimulation of the body (as Descartes argues to be the case for all sensory and imaginative ideas) cannot be said "to come to me from nowhere else but from myself".[9] Accordingly, for Descartes no idea is innate to the faculty of imagining or to the faculty of sensing as such, as if these faculties could have their own specific inborn ideas, alongside the inborn notions of the intellect. Or, to put it shortly, for Descartes there are neither innate imaginative ideas nor innate sensory ideas.[10] As already shown in §4, even when, in the 1648 *Notes* against Regius, Descartes affirms that "there is nothing in our ideas which is not innate to the mind" he is not thereby professing a radical form of innatism, but only intends to point out that the representational content of sensory ideas, albeit caused by an external object rather than being freely established by the subject himself, is not however fully *determined* by the object alone but also depends on the specific "institution" of the perceiver's mind (a theory expounded in §25). Even in that case Descartes does not however speak of ideas innate to faculties other than the understanding, but only "to the mind – that is, to the faculty of thinking" as a whole: properly speaking, an innate idea can in fact only be innate to the pure understanding (since this is what the mind essentially consists in).[11]

According to Descartes, the ideas of colors and like qualities are indeed adventitious, as he takes great pains to prove always in the *Sixth Meditation* by taking into account their

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[9] *Responsiones* II; AT VII 133, 20-12: "*Hanc ideam mihi esse innatam*, sive non aliunde quam a meipso mihi advenire".

[10] Being the cognitive faculties functions of one and the same power, it also follows that they cannot have different transcendental principles: the only principles of this sort that Descartes could admit would indeed be principles of the understanding in the broad and hence in the strict sense of the term (*viz.* the intellect). Descartes' theory of the mind is thus excluding *a priori* the very possibility of a "transcendental aesthetics" in Kant's sense. For Kant, accordingly, the common "root" out of which all faculties are supposed to branch off remains unknown and the unity of all sciences only a regulative ideal, whereas Descartes takes both as the starting points of his enquiry (deducing the unity of science from the unity of cognition), as attested by the passage from the *First Rule* already discussed in §5. As for Kant, see *Kritik der reinen Vernunft* A15/B29: "es zwei Stämme der menschlichen Erkenntnis gebe, die *vielleicht* aus einer gemeinschaftlichen, aber uns unbekannten Wurzel entspringen, nämlich Sinnlichkeit und Verstand" (emphasis added).

[11] *Notæ in Programma*; AT VIII-2 358, 25-27; CSM I 304*. In order to emphasize his outright disagreement with Aristotelian Scholastic epistemology, Descartes broadens here the concept as to qualify as innate the representative content of sensory ideas, inasmuch as this content depends on the nature of the understanding broadly conceived – *viz.* of the cognitive power as responsive to the stimulations coming from the body to which it happens to be conjoined.

representative content and order of occurrence in the timeline of thoughts of ideas of this sort. This allows to illuminate Descartes' claim (made before the distinction between imagination and sensibility having properly established and, accordingly, put forward only an a hypothesis) that "colors, sounds, tastes, pain and so on… *seem* to have reached the imagination via the senses".[12] The reason why Descartes, at the beginning of the *Sixth Meditation*, conjectures that colors and the like have a sensory origin is simply because it is positive that, contrary to what happens with shapes and the like, they do not have an intellectual one – i.e. they do not stem from the mind itself. As a matter of fact, even an *embodied* mind cannot succeed in apprehending ideas of this sort if the body to which is conjoined does not work properly, so that the physiological stimulations that would trigger the sensation of, say, colors are lacking (as is the case for blind people). Descartes acknowledged of course the existence of color concepts – *viz.* of intellectual ideas of colors formed out of color sensations (besides the sensation of red we do indeed have the concept of this color, as well as of color in general). The point, though, was to figure out where ideas of this kind originally stemmed from, and this is what the distinction between factitious, innate and adventitious ideas is entirely about.[13]

It must be noticed that the features of material objects that Descartes argues to come to the mind through the sense (rather than from the pure understanding) are actually nothing but the *proper sensibles* of the Aristotelian tradition: those features of bodies, namely, that can be apprehended by one sense only, a list that surfaces in many places of the work and that Descartes duly spells out in presenting it for the first time: "light and colors, sounds, smells, tastes, heat and cold and all the other tactile qualities".[14] Descartes' readers, trained as they were in Aristotelian philosophy, immediately recognized the reference. The claim that the ideas of these features of bodies "have reached the imagination via the senses" was therefore taken for obvious by virtually all Descartes' readers, and this consent explains why he put it forward so briskly (although, once again, for the time being only tentatively). Descartes, however, does not intend to ground the distinction between two classes of ideas of bodies on the distinction

[12] *Meditationes* VI; AT VII 74, 1-6; CSM II 51* (emphasis added).

[13] Cf. *Regulæ* XIV; AT X 438, 18-21; CSM I 56*: "If someone is blind from birth, we would not expect to be able by force of argument to get him to have true ideas of colors, just like the ones we acquired from the senses". On Descartes and Gassendi on color ideas in blind people, §24.

[14] *Meditationes* III; AT VII 43, 21-22; CSM II 30. All classes of proper sensibles had already been studiously mentioned by Descartes in the wax example; cf. *Meditationes* II; AT VII 30, 8-19; CSM II 20: "Let us take, for example, this piece of wax. It has just been taken from the honeycomb; it has not yet quite lost the taste of the honey; it retains some of the scent of the flowers from which it was gathered; its color, shape and size are plain to see; it is hard, cold, and can be handled without difficulty; if you rap it with a knuckle it makes a sound".

between proper and common sensibles (i.e. the sensibles features common to all sense or, at least, to both sight and touch, such as shape and movement). Descartes sketched an argument along these lines in the *Rules*, where he defended the priority of shape over color claiming that "the concept of shape is so simple and common to be implicit in every sensibles" (*involvatur in omni sensibili*).[15] In the *Meditations*, however, Descartes is crystal-clear that he intended to sort out the properties of the (allegedly existing) material objects into two sets on the basis of a quite different criterion, namely, by distinguishing between the features of bodies of which we do have innate notions, and the ones of which we do not. Even though Descartes (as pointed out above) maintains that imaginative-sensory ideas have as their objects both shapes and colors, he could therefore argue that shapes and colors are yet not on a par, and it is precisely by virtue of this disparity that he suggests an initial distinction between sensibility and imagination:

> I distinctly imagine quantity – "continuous" quantity, as the philosophers commonly call it – or the extension of this quantity (or, more precisely, the extension of an object endowed with a quantity) in length, breadth, and depth. I also enumerate various parts in this object, and to these parts I assign various sizes, shapes, positions and local motions; and to the motions I assign various durations […] But besides that corporeal nature which is the subject-matter of pure mathematics, I also imagine many other things, such as colors, sounds, tastes, pain and so on – though not so distinctly (*sed nulla tam distincte*) … I perceive them better through the senses, via which, thanks to memory, they seem to have reached the imagination (*a quo videntur ope memoriæ ad imaginationem pervenisse*).[16]

Descartes' claim that extension, shape and motion are "distinctly imagined", whereas I do imagine "color, sounds, tastes… though not so distinctly" can thus be straightforwardly accounted for appealing to Descartes' theory that the subject possesses innate ideas only of the former class of properties (a reading, it must to noticed, that has the great advantage of spelling out in rigorous terms what would otherwise remain a mere unwarranted statement concerning an alleged psychological difference in perceiving shapes and colors).[17]

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[15] *Regulæ* XII; AT X 413, 7-8; CSM I 41*. Descartes' argument to pattern perceived color-differences after shape-differences will be analyzed in detail in §§24-25.

[16] *Meditationes* V; AT VII 63, 16-21 & *Meditationes* VI; AT VII 74, 1-6; CSM II 44* & 51*. The relation between memory and imagination is discussed at the end of the chapter.

[17] Humber's claims that for Descartes imagination is confined to the class of obscure and confused perceptions is therefore to be rejected; James M. Humber, "Recognising Clear and Distinct Perceptions", *Philosophy and Phenomenological Research* 41/4 (1981): 487-507. See also *Meditationes* VI; AT VII 73, 25-26: "ea naturæ corporeæ idea distincta, quam in imaginatione mea invenio". Humber, in order to defend his reading which confines clear and distinct perception to intellectual ideas, simply passed over silence these passages (a dismissive footnote aside) and

This piece of Descartes' philosophy explains why, at the beginning of the *Sixth Meditation*, Descartes only considers the imagining of geometrical figures, leaving colors aside. Even though the actual relationship between intellect and imagination remained to be determined, Descartes had in fact already proven that imagination, being a mode of the *substantia intelligens*, is a specification of the one *facultas cognoscitiva*. Moreover, and as already pointed out, Descartes for the time being was not considering the faculty of imagining as such (by itself also responsible for involuntary phenomena such as dreams and daydreaming) but only the faculty of imagination insofar as it brings about image-like ideas. But since properly speaking it is not the imagination to imagine, but the one mind that resolves to bring about an image-like idea (to then perceive that such an idea has been formed), Descartes argues that this freely-produced imaginative idea must be patterned after an idea of the understanding. Not that the mind had first to work out an abstract concept to form the corresponding image only at a later stage. Still, it is always the mind as a whole – as both willing and understanding – that freely decides to mold an image-like idea, so that all actively-produced imaginative ideas must initially have been an idea of the understanding as such (i.e. of the intellect), where the priority is of course to be understood in a logical, not in a temporal sense. When Descartes contrasts the ideas of the intellect with the ideas of the imagination this is in fact mostly to make clear that not all intellectual notions can have an adequate imagistic representation. The reverse claim does not hold true, though. All factitious imaginative ideas are in fact also intelligible. Actually, it is precisely because they have been understood that they can be voluntarily imagined: "when the soul uses the will to determine itself to some thought which is *not just intelligible but also imaginable*, this thought makes a new impression in the brain; this is not a passion within the soul, but an action, and this is what is properly called 'imagination'".[18] Therefore, the reason why Descartes, at the beginning of the *Sixth Meditation*, studies the imaginings of nothing but geometrical figures is simply that, at that stage of the enquiry, he is only concerned with the subject's capacity

went so far as to illegitimately rephrase Descartes' argument at the beginning of the *Sixth Meditations* in terms of a *clear* imagination; cf. James M. Humber, "Recognising Clear and Distinct Perceptions", *Philosophy and Phenomenological Research* 41/4 (1981): 487-507. The next chapters argue at length that Descartes' entire philosophy can be rephrased by dispensing completely with any reference to clarity, obscurity, distinctness and confusion (as exemplified with the passage in question).

[18] To Elisabeth, 6 October 1645; AT IV 311, 8-13; K 271*: "Lorsqu'elle [the rational soul] use de sa volonté pour se determiner à quelque pensée qui *n'est pas seulement intelligible, mais imaginable*, cette pensée fait une nouvelle impression dans le cerveau, cela n'est pas une passion, mais une action, qui se nomme proprement imagination" (emphasis added).

to bring about image-like ideas which correspond to the innate (intellectual) ideas of the "corporeal nature that is the subject-matter of pure mathematics".

It can thus be perfectly explained why Descartes, after having argued for the *possibility* for material objects *qua geometrical objects* to exist on the basis of the innate intellectual ideas of geometrical objects, turns to the subject's capacity to *imagine* the same figures (rather than colors and the like), wondering whether this other function of the cognitive power could lend a conclusive proof of this claim. In order to probe whether the subject's capacity to bring about image-like ideas of geometrical figures provides evidence that material objects exist, Descartes must of course first of all explain what the difference between a purely intellectual idea and an image-like idea would consist in. Accordingly, in the first pages of the *Sixth Meditation* Descartes undertakes a close investigation of the phenomenological marks that distinguish the ideas of imagination from the ideas of the intellect – what he calls the *distinctionum signa*.[19]

Descartes does not in fact articulate the distinction between intellectual ideas and imaginings in logical terms, by appealing, for example, to the opposition between universals and particulars or to the fact that only intellectual notions can feature in a proposition and, hence, in a judgment. As a matter of fact, he reacted quite harshly against some early attempts to restate his point along these lines:

> I must tell you that your friend has altogether missed my meaning when, in order to mark the distinction between the ideas in the imagination and those in the intellect (*esprit*), he says that the former are expressed by terms, and the latter by propositions. It is not whether ideas are expressed by terms or by propositions which makes them belong to the intellect or the imagination, *as they can both be expressed in either way*. It is the manner of conceiving them which makes the difference: whatever we conceive without an image is an idea of the pure intellect, and whatever we conceive with an image is an idea of the imagination.[20]

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[19] Cf. *Meditationes*, *Synopsis*; AT VII 15, 20-22; CSM II 11*: "In sextâ denique, intellectio ab imaginatione secernitur; distinctionum signa describuntur". The French translation renders the expression as: "enfin, dans la sixième, je distingue l'action de l'entendement d'avec celle de l'imagination; les marques de cette distinction y sont décrites" (AT IX-1 11). The term *signa* in analogously employed by Descartes in the *Principles* to discuss the impossibility to tell apart sense-perceptions from imaginings based on their aspectual character alone; cf. *Principia* I 4; AT VIII-1 6, 5-7: "nulla que sic dubitanti signa apparent, quibus somnum a vigilia certo dignoscat".

[20] To Mersenne, July 1641; AT III 395; K 186* (emphasis added). See also the related reply To Mersenne, 22 July 1641; AT III 417; K 187: "I do not understand your question whether our ideas are expressed by a simple term. Words are human inventions, so one can always use one or several to express the same thing". The importance of Descartes' refusal to articulate a logical (as opposed to merely linguistic) distinction between terms and propositions has already been pointed out by Alan Gewirth, "Clearness and Distinctness in Descartes", *Philosophy* 18 (1943), 23-

What marks the distinction between intellectual notions and imagining is indeed according to Descartes "la manière de les concevoir" or, to cast the issue in terms closer to us, the different *aspectual character* of these two sorts of ideas. As already pointed out in §0, the term is not Descartes', but captures an important feature of his theory of ideas which eludes the mere distinction between the formal and the objective reality of an idea. According to Descartes, two numerically distinct ideas, despite being two acts of thought, might indeed be ideas of the same object and have thus the same representative content, and this is precisely what happens to be the case with the intellectual and the imaginative idea of a triangle, being both about the same geometrical figure. What Descartes struggles to prove in the *Sixth Meditation* is that these two ideas present nonetheless themselves in two completely different ways – i.e. that they have a different *presentational* or *aspectual* character – trying to articulate the difference between pure understanding and imagination precisely on this ground.

It must be pointed out that the starting point of Descartes' enquiry into the cognitive faculties of the mind in the *Meditations* are not indeed the faculties as such (which admittedly escape direct observation), but the ideas, whose different characters led him to ascribe different functions to the one *vis cognoscens*, thereby articulating it in different faculties. This epistemological priority of ideas over faculties is reflected by the title of the chapter, which singled out "intellectual, imaginative and sensory ideas" as its topic of investigation, rather than the faculties in their own right (this epistemological priority might also explain, by the way, why Descartes did not feel compelled to work out an accurate metaphysical theory of the faculties: his main interests lied elsewhere).

Besides lacking a technical term for so salient a feature of ideas, Descartes' analysis of the different aspectual character of intellectual and imaginative ideas proves to be quite sketchy, not to say largely unsatisfactory. As a matter of fact, Descartes basically contents himself with

25. Consequently, as rightly pointed out by Simmons, "Descartes is indifferent to the distinction we now make between object thoughts and propositional thoughts (e. g., seeing a dog *vs.* seeing that there is a dog in the room). As far as Descartes is concerned, these are just two different linguistic ways to describe a single mental phenomenon, and they can both be used to describe either sensory/imaginative thoughts or intellectual thoughts"; Alison Simmons, "Cartesian Consciousness Reconsidered", *Philosophers' Imprint* 12/2 (2012), 4. Descartes did nonetheless think that only the intellect can attain universality (whether all ideas of the understanding are universal is yet of course another point); cf. To Regius, 24 May 1640; AT III 66; K 148*: "I do not see why you think that 'the perception of universals belongs to the imagination rather than to the intellect'. I attribute it to the intellect alone, which refers to many things an idea that, taken by itself, is singular (*soli intellectui tribuo, qui ideam ex se ipsâ singularem ad multa refert*)".

remarking that the imagining of a triangle has an image-like character that is lacking in the case of a purely intellectual idea (indeed). This might well be true, but remains of course completely uninformative and runs the risk to be turn into the tautological claim that imagination is the faculty of images, without advancing one step further in expounding on the nature of these images. As a matter of fact, Descartes' description of the aspectual (or presentational) character of imagining relies to a great extent on the concept of an "eye of the mind", or "mental sight" (*mentis acies*), a metaphorical term whose proper meaning is yet hard to determine:

> When I imagine a triangle… I do not merely understand (*intelligo*) that it is a figure bounded by three lines, but at the same time I also see the three lines with the eye of my mind as if they were present before me… can *understand* a pentagon without the help of the imagination, but I can also *imagine* a pentagon, by applying the eye of my mind to its five sides and the area contained within them.[21]

Descartes' main point, in speaking of an "eye of the mind", is to claim that the intellectual apprehension of a geometrical figure and the experience of the corresponding image differ insofar as the imagining resembles visual experience. Even the qualification "*as if* they [the imagined lines] were present" is to be explained in the light of an implicit comparison of imaginings with sense-perceptions. Imagination had indeed traditionally been defined – or, at least, characterized – as the faculty to "make present" an object by bringing about an image of it in the absence of a sense-perception of the object (as is the case in dreams, for example) and Descartes too agrees that this was a defining feature of the imaginative process. Descartes is thus suggesting that an imagining of a triangle is tantamount to a vision of the same figure, except for the fact in the former case no triangle is actually present to the subject – i.e. his eyes are no confronted with any like a figure. Most of Descartes' contemporaries understood of the imagination along similar lines and indeed none of his objectors seems to have had troubles following Descartes' line of reasoning. Descartes, though, could not present the matter in straightforward terms, simply because at this stage of the enquiry he has not yet investigated (and, thus, even the less explained) the nature of sense-perception, and this is why he had to rely on the metaphorical talk of an "eye of the mind", which is intended to take over the

[21] *Meditationes* VI; AT VII 72, 6-28; CSM II 50-51: "Nempe, exempli causa, cum triangulum imaginor, non tantum intelligo illud esse figuram tribus lineis comprehensam, sed simul etiam estas tres lineas tanquam præsentes acie mentis intueor, atque hoc est quod imaginari appello... Si vero de pentagono quæstio sit, possum quidem ejus figuram *intelligere*... absque ope imaginationis; sed possum etiam eandem *imaginari*, applicando scilicet aciem mentis ad ejus quinque latera, simulque ad aream iis contentam" (emphases added).

function of the proper eye, whose existence (together with the existence of any material object) is still under doubt.

Although sketchy, Descartes thinks that the investigation carried on at the beginning of the *Sixth Meditation* at least positively establishes that "the power of imagining (*vis imaginandi*) that is in me, differing as it does from the power of understanding, is not a necessary constituent of my own essence – that it, of the essence of my mind – as I would remain the same as I am now even if I was lacking it".[22] How this difference is to be accounted for remains to be determined, although Descartes argues that from what has been said "*seems* to follow that this power depends on something different from myself",[23] and that the aspectual character of imagining could be "easily explained" by supposing that this *res a me diversa* is a body the mind "turns to" while imagining,

> and since I can think of no equally suitable way of explaining imagination, I can conjecture that the body probably exists. Only "probably", though, and much as I examine the matter I do not yet see how I can draw any inference proving that some body necessarily exists from the distinct idea of corporeal nature that I find in my imagination.[24]

The *aliquod corpus* whose existence would be suggested by the imagination is of course the subject's body, *corpus meum, quo in imaginando utor*: "my own body, of which I make use in imagining".[25] Descartes, who did not admit merely probable conclusions in metaphysics, could not however be satisfied with this argument (for more on this point, see §9). Descartes, accordingly, proceeded to consider the subject's power to *receive* adventitious ideas which, in his views, would have finally supplied the expected conclusion that material objects exist. It would be only at stage point, in retrospect, that the tentative theory of the imagination sketched at the beginning of the *Sixth Meditation* is validated, and Descartes could take to have established that "imagination is nothing but the application of the cognitive faculty to a body to which this power is intimately present", all cautions aside.

Once this decisive piece of his theory of the mind has been vindicated, Descartes could also finally explain more in detail what this *applicatio facultatis cognoscitivæ ad corpus* he was referring to would consist in, an issue that the *Sixth Meditation* almost passes over in silence, but that Descartes had to address in replying to his objectors. Gassendi was especially critical of this

[22] *Meditationes* VI; AT VII 73, 5-9; CSM II 51*.

[23] *Ibid.* AT VII 73, 9-10; CSM II 51*.

[24] *Ibid.* AT VII 73, 21-28; CSM II 51*.

[25] *Conversation with Burman*; AT V 162.

point and, more in general, of Descartes' distinction between imagination and pure understanding, contending that the mind, were it really unextended the way Descartes took it to be, could by no means "have an idea" of an extended object.[26] Descartes objected that if by "idea" one means (as Gassendi consistently does, and Descartes had been doing in the writings before the *Meditations*) an impression on the external or on the internal organs – traditionally referred to also as the *species in organo* – then there is undeniably no room for it in an unextended mind. Descartes, however, argues that "the forms (or corporeal *species*) that must be in the brain for us to imagine anything are not thoughts" – not according to his definition of thought, at least.[27] Descartes insisted that by "idea" he meant something quite different: a thought, namely, a purely mental item. And the mind, which clearly knows extended objects, can thus clearly be said to have an idea of them (Gassendi would of course have objected that is a man, made of mind and body, to know, not a mind allegedly existing on its own). Descartes, still, thinks that brain impressions play a pivotal role in the cognitive process, since is nothing but a reference to these physical impressions on the pineal gland to distinguish between the *vis cognoscens* insofar as it entertains thoughts of its own (the pure understanding) from the imagination. Even though the *species* themselves should not be taken to be thoughts, for Descartes, on the other hand, "the operation of the mind that imagines – i.e. of the mind turning itself to these *species* – is a thought" or, trying to better capture the full meaning of the sentence, "a [way of] thinking".[28] Even in imagining, though, Descartes insists that nothing enters the mind. He remarked against Gassendi that he had indeed spoken of an "application of the mind", not of a "reception" of anything in it:

> You ask "how I think that an unextended subject could receive the species – or idea – of a body, which is extended". I answer that the mind does not *receive* any corporeal species: the pure intellection of both corporeal and incorporeal things occurs without any corporeal species. In the case of imagination, however, which can only have corporeal things as its object, we do indeed require a species which is a

[26] *Objectiones* V; AT VII 337, 22 - 338, 12.

[27] To Mersenne, 21 April 1641; AT VII 361; K 180*. Also in the *Meditations*, though, mostly driven by the debate, Descartes uses at least in one occasion "idea" with the meaning he assigned to the term in his early writings, as when he protests that the idea of God is better known that any material objects, of which we have an idea *quammaxime crassam & palpabilem*; cf. *Responsiones* II; AT VII 138, 7-8.

[28] *Responsiones* V; AT VII 387, 6-14: "Formæ sive species corporeæ, quæ esse debent in cerebro ut quid imaginemur, non sunt cogitationes; sed operatio mentis imaginantis, sive ad istas species se convertentis, est cogitatio".

real body, to which the mind *applies* itself, without yet being *taken in* by the mind (*ad quam mens se applicet, sed non quæ in mente recipiatur*).[29]

Even in case it is the mind itself to bring about an image-like idea by voluntarily tracing an impression on the glad (rather than simply registering that such an impression has been formed), Descartes makes clear that these "images of material things are formed *by* my thought", but not "*in* it".[30] Although specifying what the body to which the cognitive power is said to be "intimately present" amounts to (the brain namely and, more specifically, a specific portion of it: the pineal gland) and making clear that imagining does not consist in receiving a *species*, Descartes' statements on the matter does not however bring much closer to understand what this "application" of the mind is supposed to be.

What can be said with certainty is that Descartes scorned the idea that, in addition to the eyes we know, there would be "other eyes in our brain", responsible for the perception of these impressions, thereby rejecting right away the "homunculus fallacy" he is sometimes mistakenly charged with.[31] His manifold visual metaphors to illustrate the mind's awareness of what is going on in the body to which it happens to be conjoined must therefore be taken for what they are: metaphors. Descartes, indeed, spoke of ideas in the *corporeal* sense of the term (i.e. brain impressions) which cannot be understood in any possible sense as "depictions" of the bodily state which brought them about and that they, in turn, are said to represent, as is for example the case with the ideas of "hunger, thirst, and other internal passion".[32] Descartes did in fact not intend to account for the content of non-intellectual experience by appealing to the mind's gazing at the pineal gland (whatever this could be taken to mean), but argued for the existence of an orderly *correspondence* between bodily and mental states mediated by the "institution of the perceiver's nature" (expounded in §25). The theory is most famously exemplified by Descartes' concept of an "institution of nature" but, as a matter of fact, it applies (all relevant differences aside), not only to the perception of colors and passions, but also to the perception of shapes.

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[29] *Ibid.* (emphases added).

[30] *Meditationes* II; AT VII 29, 21-22: "res corporeas, quarum imagines cogitatione formantur". The CSM translation is indeed completely astray on this point; cf. CSM II 20: "in my thought". The French authorized translation confirms this reading; cf. AT IX-1 23: "par ma pensée".

[31] On Descartes' alleged "homunculus fallacy" see Bernard Williams, *Descartes: The Project of Pure Enquiry* (London - New York: Routledge 1978). Passages like the one quoted in the main text (from *Dioptrique* VI; AT VI 130, 9-10; O 101) make clear that Williams' criticism is almost completely misplaced, to the point of becoming a sort of straw-man argument in the literature on the topic.

[32] Cf. *Discours* V; AT VI 55, 17-19; CSM I 139.

As well as to the imagining of these geometrical figures: Descartes' point is indeed that the subject can resolve to bring about a change in his body (analogous to his decision to raise one of his arms), thereby causing the mind to apprehend that this change occurred. The subject's decision to imagine a triangle (i.e. to bring about an image-like idea corresponding to the innate idea of the triangle) would accordingly result in a bodily change which, in turn, results in the mind having a certain perception with a certain character. By claiming that the mind, in imagining, "directs itself" to the brain Descartes only meant therefore that the mind, once conjoined with a body, is *responsible for* and *responsive to* (some of the) physiological changes taking place in the brain. And this function of the mind is what he calls "the imagination".

One of the most consequential and straightforward implications of Descartes' theory of the imagination as the function of the mind *qua* concerned with brain impressions (rather than with nothing but its innate notions) is of course that imagination and pure understanding differ *in kind*. Although Descartes argued that the intellect and the imagination are specifications of one and the same cognitive power, he opposed in fact the claim that they would differ only as a matter of degrees, so that the intellect could maybe turn out to be nothing but a sort of refined form of imagining. This claim, as a matter of fact, was not a mere conceptual possibility left open by the theory of the faculties, but a thesis fiercely defended by some of Descartes' strongest opponents, most notably of all by Gassendi but also, for example, by Regius (as already shown in §4).

Gassendi, in particular, argued that the *vis imaginandi* and the *vis intelligendi* are "actions of one and the same faculty… [so that] *if* there is a distinction between the two, it seems to be no more than one of degree (*secundum magis & minus*)".[33] He rebutted thereby Descartes' claim that

[33] *Responsiones* V; AT VII 329, 7-9; CSM II 228 (emphasis added). Descartes, for whom the intellect and the imagination are specifications of the understanding – i.e. of the mind *qua* passive (as argued in §1) – normally speaks of the "operations" of these faculties, not of their "actions" (as done by Gassendi). See nonetheless the French version of the *Meditations*, where the opening pages of the *Sixth Meditation* are said to be devoted to tell apart "l'action de l'entendement d'avec celle de l'imagination" (AT IX-1 11), whereas the original text only speaks of *intellectio* and *imaginatio* (AT VII 15, 20-21). In the *Rules*, on the other hand, where the *vis cognoscens* was taken to be both active and passive Descartes could legitimately speak of *intellectus nostri actiones*; cf. *Regulæ* III; AT X 368, 8-9 (the claim defended in the *Rule* XII was thus in line with Descartes' theory as defended – possibly quite a few years before – in the *Rule* III). See also *Regulæ* IX; AT X 401, 2: "cogitationis actu". In his replies to Hobbes Descartes speaks of *actus, quos vocamus cogitativos* ("ut intelligere, velle, imaginari, sentire &c.") but in this context the expression – which Descartes takes from Hobbes – refers to the substance's "acts, that is (*sive*) accidents" (as Descartes hastens to gloss), so that he also speaks of "actus quidam, quos vocamus corporeos, ut magnitudino, figura, motus & alia…"; *Responsiones* III, AT VII 176, 1-19; CSM II 124. Descartes does yet speak in a least one occasion of an "actus cogitandi" (To Arnauld, 29 July 1648; AT V 221) and while outlining the Aristotelian conception of the soul

"the power of imagining, insofar as is distinct from the power of understanding, is not a necessary constituent of [the mind's] essence" wondering "how can that be, if they are one and the same power, and the difference in functioning is merely one of degree?".[34] Gassendi took the cue for this objection precisely from a passage of the *Sixth Meditation*, where Descartes famously tried to articulate the distinction between the imagination and the understanding by contrasting the imaginative idea of a chiliagon with the corresponding concept:

> If I want to think (*cogitare*) of a chiliagon, although I understand (*intelligo*) that it is a figure consisting of a thousand lines just as well as I understand the triangle to be a three-sided figure, I do not in the same way imagine the thousand lines – that is, I do not see them as if they were present before me. And even though, since I am used to always imagine something whenever I think of a corporeal thing, I maybe represent to myself (*mihi repræsentem*) a certain confused figure. Evidently, though, this figure is not a chiliagon, for it differs in no way from the figure that I would represent to myself if I were to think of a myriagon or of any other figure with many sides.[35]

Descartes' point, in speaking of the chiliagon, was not however to distinguish between pure understanding and imagination by appealing to a difference in confusion, supposedly arguing that only the former faculty is capable of distinct perception.[36] Such a distinction would indeed be a mere matter of degrees, as rightly pointed out by Gassendi, who argued that "distinctness gets lost and confusion acquired step by step (*per gradus*)".[37] Descartes, however, did by no means confine imagination to confused perceptions: contrary to what happens with the image of a chiliagon, the imaginings of a triangle and of a pentagon (discussed by Descartes in the very same pages) are indeed *distinctly* perceived, and Descartes reportedly claimed that this can also be the case with fictional beings, arguing that "we imagine with the uttermost clarity" a

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in the *First Meditation* he designates thinking together with walking as "actiones" of the soul (AT VII 26, 6-8); cf. Vere Chappell, "The Theory of Ideas" in Amélie Oksenberg Rorty ed., *Essays on Descartes' Meditations* (Berkeley - Los Angeles - London: University of California Press 1986), 196. The latter passage can however be easily dismissed as is clearly not intended to account for Descartes' considered views.

[34] *Ibid.* AT VII 331,19-23; CSM II 230.

[35] *Meditationes* VI; AT VII 72, 10-21; CSM II 50*.

[36] The next chapter offer a fully-fledged defense of this claim. Gassendi argued that the claim should, in case, be reversed, and provocatively accused Descartes of "belittling the understanding while extolling the imagination", by advancing an alternative reading of the chiliagon example; cf. *Objectiones* V; AT VII 331, 14-15; CSM II 230.

[37] *Ibid.* AT VII 330, 17-18; CSM II 229*.

chimera.[38] Descartes, as a matter of fact, remarked that some individuals, thanks to their natural capacities and a constant training, can competently imagine figures that escape someone's else imagination, and Descartes is reported to have claimed that, being "imaginative enough", contrary to what happened with the vast majority of people he could imagine "quite distinctly" a heptagon or an octagon.[39]

By pointing out that imagining geometrical figures becomes more and more difficult as the number of their sides increases, whereas this is not the case for intellectual apprehension, Descartes in fact only wanted to show that "in order to imagine I have to make a certain peculiar exertion of the mind (*mihi peculiari quadam animi contentione opus esse ad imaginandum*), which is not required to understand".[40] Of course Descartes' point was not even that imagining a geometrical figure might prove to be more difficult than understanding it but, once again, that imaginings have a peculiar aspectual character that sets them aside from purely intellectual notions and that, accordingly, bringing about one of these imagining requires a "novel exertion" of the mind's capacities (*nova animi contentio*)".[41] Descartes thought he can actually provide a straightforward physiological explanation of the reason why imagining a figure with many sides proves so difficult:

> The reason is that my mind can easily form and depict three lines in the brain, and easily go on to contemplate them, and thus imagine a triangle, pentagon, etc. It cannot, however, trace out and form a thousand lines in the brain except in a confused manner, and this is why the mind does not imagine a chiliagon distinctly, but only in a confused manner… This now also makes it clear why we see the lines as if they were present in front of us, and it further explains the specific exercise of the mind (*singulari animi contentione*) that is needed for imagining and for perceiving the body in this way. [42]

For Descartes imagining is indeed a specific function of the mind, "une façon de penser particulière pour les choses matérielles": specific not because of its object (which can also be apprehended by intellect), but because the aspectual character of its ideas, since "imagining is nothing but contemplating the figure – or image – of a corporeal thing", whereas "pure

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[38] *Conversation with Burman*, 16th April 1648; AT V 160: "clarissime imaginemur caput leonis adjunctum corpori capræ, & similia". On the concept of clear and distinct in relation to Descartes' distinction between intellectual, imaginative and sensory ideas, see below §11.

[39] *Conversation with Burman*; AT V 163; K 345*.

[40] *Meditationes* VI; AT VII 72, 28 - 73, 2; CSM II 51*.

[41] *Ibid.* AT VII 73, 2-3; CSM II 51.

[42] *Conversation with Burman*; AT V 162-63; K 345*.

understanding… is not concerned with physical images" at all.[43] Descartes, accordingly, concluded (against Gassendi) that "the powers of understanding and imagining do not differ merely in degree, but are two altogether different kinds of [mental] activities".[44]

Descartes' definition of imagination remains clearly non-committal by itself on whether imaginative ideas are factitious, adventitious, or both (whilst ruling out that they can be innate) and it has already been explained why at the beginning of the *Sixth Meditation*, dedicated as is to prove the existence of external objects, Descartes had only considered *factitious* image-like ideas. The issue is addressed in the next two chapters, devoted to demonstrate, respectively, that for Descartes not *all* factitious ideas are imaginative and that even the reverse claim proves false, as the previous discussion of the dream argument should already have made clear enough: it is only in the very last page of the *Meditations* that Descartes is indeed finally be able to explain how he intended to tell apart the perceptions of existing objects (*sensory* adventitious ideas) from the ideas resulting from a merely *internal* change of the perceiver's body (*imaginative* adventitious ideas).

[43] The three passages are taken, respectively, from *Discours* IV; AT VI 37, 6-8. *Meditationes* II; AT VII 28, 4-5; CSM II 19*. *Notæ in Programma*; AT VIII-2 363, 22-24; CSM II 307: "intellectionem puram, hoc est, intellectionem quæ circa nullas imagines corporeas versetur". As the chapter that is about to conclude has tried to show, the gist of Descartes' theory of the imagination and of its relationship with the intellect remained indeed substantially unaltered throughout Descartes' writings (with the partial exception of the *Rules*).

[44] *Responsiones* V; AT VII 385, 5-7; CSM II 264*: "vires intelligendi et imaginandi non differre tantùm secundùm magis & minus, sed ut duos modos operandi plane diversos". On the legacy of the debate between Descartes and Gassendi on later thinkers see Thomas M. Lennon, *The Battle of God and Giants: The Legacies of Descartes and Gassendi, 1655-1715* (Princeton, NJ: Princeton University Press 1993).

§7. Imaginative *vs.* factitious ideas

Whereas in the literature on Descartes there is an almost unspoken consensus that innate, factitious and adventitious ideas correspond, respectively, to the ideas of the pure intellect, imagination, and sensibility, the most watchful of Descartes' first readers were perfectly aware that the two taxonomies were not to be conflated. Adriaan Heereboord, for example, went so far as to articulate the difference between "the principles naturally inborn in the mind and the conclusions deduced from them" (the perception of both having without doubt to be ascribed to the pure understanding) in terms precisely of innate and adventitious ideas – the deduced ideas being "adventitious" inasmuch as the subject is not free to think of them otherwise once he has resolved to reflect on a certain (innate) notion.[1] Descartes would have objected that, even though *b* logically follows from *a,* this, by itself, does not entail that, after having thought of *a*, the subject would invariably entertain the thought that *b* is the case. In other words, Descartes would have objected that Heereboord was here confusing the temporal and the logical meaning of the relation of "following" – "coming after". For Descartes, as already shown, innate ideas are in fact always thought of "at will" (*ad arbitrium*). Heereboord was still absolutely right in divorcing Descartes' distinction between factitious, innate and adventitious ideas from his other tripartite distinction between intellectual, imaginative and sensory ideas.

The divergence between the two taxonomies is made as explicit as possible by Descartes in a private annotation, where any mention of the imagination is studiously omitted, despite an explicit reference to both the understanding and sensibility in relation, respectively, to innate and to adventitious ideas:

> Innate ideas differ from adventitious ideas, as well as from made – or factitious – ones, insofar as an action of the will contributes to factitious ideas, to the adventitious ones the senses, whereas innate ideas require nothing but the perception of the intellect.[2]

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[1] Adriaan Heereboord, *Melemata Philosophica* (Nijmegen: Hoogenhuysen 1664), II 341: "Philosophiæ principium a quo, est ratio, mens, naturale intellectûs humani lumen, per principia menti naturaliter insita & conclusiones eductas, seuper ideas innatas & adventitias".

[2] *Annotationes quas videtur D. des Cartes in sua* Principia Philosophiæ *scripsisse*; AT XI 655 (my translation): "Differunt nihilominùs ideæ innatæ ab adventitiis & factis sive fictitiis, quòd ad fictitias voluntatis actio concurrat, ad adventitias sensus, ad innatas sola intellectûs perceptio". See AT XI 207-210 for a brief account of the manuscript history. The outstanding philosophical quality of these remarks and textual comparison with Descartes' letters and edited works leave yet no doubt about Descartes' authorship: compare for example the entire section from which the passage already quote had been taken with To Mersenne, 16 October 1639 (AT II 597-98). I will articulate this

The main reason why this piece of Descartes' philosophy has failed to be appreciated are arguably Descartes' usual examples of factitious ideas, which seem to suggest that factitious ideas are nothing but the products of the imagination under a different name. "Sirens, hippogriffs and the like" (the first instances of factitious ideas mentioned by Descartes in introducing the concept) were indeed traditionally ascribed to this faculty, and Descartes agrees with this attribution.[3] Part of the misunderstanding seems also to arise from a confusion over the meaning of *fingere*, the verb by which Descartes standardly refers to the making of a factitious idea. *Fingere* and cognates are indeed sometimes taken by interpreters to refer to nothing but the delusive creations of the imagination, but Descartes in fact does explicitly speak of ideas "assembled through a fiction of the understanding" (*per figmentum intellectûs componuntur*).[4] Most interpreters, moreover, tend to associate this faculty with nothing but errors and delusions, notwithstanding Descartes' theory of a "distinct imagination" and its role in the foundation of physics as defended in the *Fifth Meditation*.[5] This erroneous picture derives from a selective focus on the first of the *Meditations*, where Descartes denounces the mistakes resulting from a misuse of this faculty, while he deals with its positive use, within its scope of validity, only in the last two *Meditations*, devoted, respectively, to the essence and existence of material objects.[6]

One of the main concerns of the first of the *Meditations* is indeed to prove that notions like the mind and God are purely intellectual – i.e. that they are not derived from the imagination or the senses – and that, as a consequence, any attempt to "depict" these notions (that is, to represent God and the "I" as if they were bodies) results in error. In this case, the mind would in fact be erroneously portrayed "as something tenuous, like a wind or fire or ether, permeating

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claim in a commented edition with translation of these *Annotationes* that I plan to provide as soon as possible. As a case for their relevance – both theoretical and historical – see Daniel Garber, *Descartes Embodied: Reading Cartesian Philosophy through Cartesian Science* (Cambridge: Cambridge University Press 2000), 166-67. In favour of the authenticity also Vincent Carraud, "*Cartesius* ou les pilleries de Mr. Descartes", *Philosophie* VI (1985): 3-19.

[3] *Meditationes* III; AT VII 38, 6-7; CSM II 26.

[4] *Responsiones* I; AT VII 119, 10-11; 20; CSM II 85*. Cf. *Ibid.* AT VII 117, 10-12: "ideas, quæ non continent veras & immutabiles naturas, sed tantùm *fictitias & ab intellectu compositas*" (emphasis added). On the Descartes' understanding of this "composition", see Walter Edelberg, "The Fifth Meditation", *Philosophical Review* 94 (1990): 493-533, in particular 496-97.

[5] Cf. *Meditationes* V; AT VII 63, 16. *Principia* IV 200; AT VIII-2 323, 31.

[6] On the positive role of the imagination in Descartes' philosophy, especially in his early writings, see Dennis L. Sepper, *Descartes's Imagination: Proportion, Imagines, and the Activity of Thinking* (Berkeley - Los Angeles - London: University of California Press 1996).

my most solid part".[7] It is precisely in his quest for the true nature of the "I" that Descartes comes to associate *fingere* and its derivative *effingere* with imagination and then with error, by playing with the ambivalence of these verbs:

> If the "I" is understood strictly as we have been taking it, then it is certain that knowledge of this does not depend on things of whose existence I am as yet unaware. Therefore, it cannot depend on any of the things which I invent with my imagination (*imaginatione effingo*). And this very word, "invent" (*effingo*), shows me my mistake. I would be indeed "inventing" (*fingerem*) something, if I used my imagination to establish what I am, for imagining is simply contemplating the figure, or image, of a corporeal thing.[8]

The passage, however, does not suggest that *every* imaginative act is doomed, by itself, to error, but only that, as an incorporeal entity, the "I" would be misrepresented by any image "molded" by the imagination (this being the first meaning of *fingere*, from which, in the same semantic area, the English "fictile"), since these images can just be about corporeal things. This molding of an image, as Descartes himself declared, is to be taken literally: for Descartes, as pointed out in the previous chapter, imagining requires indeed the formation – not to say an engraving – of an actual image on the brain.[9]

Despite having a sophisticated theory of the imagination, Descartes is however not always careful in his use of *imaginari*, an imprecision that has generated some confusion in the literature. Indeed, as the passage just quoted makes clear, in his views "imagining is simply contemplating the figure, or image, of a corporeal thing". Imagination, as a consequence, is just about corporeal things and there cannot be anything like a "non-corporeal" imagination, since such an "imagination without images" would be for Descartes just a plain contradiction in terms (*pace* Schouls).[10] It is true that Descartes speaks sometimes of imagining objects or states of affairs

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[7] *Meditationes* II; AT VII 26, 8-11; CSM II 17. Cf. To Mersenne, 21 Aprile 1641; AT III 362. Cf. *Meditationes* II; AT VII 29, 23-24: "istud nescio quid mei, quod sub imaginationem non venit".

[8] *Ibid.* AT VII 27, 28 - 28, 5; CSM II 18-19*. On the same lines in *Responsiones* V; AT VII 352, 26-28: "illam vulgi imaginationem, per quam fingitur id quod cogitat, esse instar venti similisve corporis".

[9] Cf. *Regulæ* XII; AT X 415, 13 - 417, 15.

[10] Based on one passage, Schouls has claimed that Descartes defended the view that God not only had an imagination, but he even had an *infinite* imagination – whatever this could mean; Peter Schouls, *Descartes and the Possibility of Science* (Ithaca - London: Cornell University Press 2000), 61. This runs however against all Descartes' express statements on the matter, in particular the crystal-clear *Responsiones* III; AT VII 181, 13; CSM II 127*: "we do not admit any phantasy in God" (*nullam in Deo phantasiam agnoscamus*). The passage referred by Schouls is *Meditationes* IV; AT VII 53, 30 - 57, 12: "Et quod valde notandum mihi videtur, nulla alia in me sunt tam perfecta aut tanta, quin intelligam perfectiora sive majora adhuc esse posse. Nam si, exempli causa, facultatem intelligendi

that are not corporeal, but this simply results from the standard use of *imaginari* in Latin, without any further implications, while *imaginatio* and *imagination* are virtually always in keeping with the theory.[11] The same is to be said about the relative adjective, and the harmless tension between these two usages, the everyday one and Descartes' technical one, is particularly clear in Descartes' statements about "les nombres imaginaires" which, contrarily to rational and irrational ones, cannot be represented geometrically precisely because they are out of the reach of imagination.[12] In many passages of the *Meditations*, actually, *imaginarius* works as a perfect synonym of "false".

Fingere shares an analogous ambiguity. From a neutral "to mold", "to make", "to invent", it comes in fact to designate something "made up", "feigned", "pretended", so that Descartes can protest against Regius that he would prefer to be called by his true French name, rather than *ficto Cartesius*.[13] The semantic drift is pretty straightforward, especially in the case under examination: since factitious ideas are "made by the mind" (*a me ipso finguntur*), it might indeed happen that they do not correspond to any actual being or state of affairs, hence the pejorative meaning that it is usually associated with these terms.[14] Descartes' concept of factitiousness, however, does not imply, just by itself, any negative bias against this class of ideas. The same definition makes clear that it would be mistaken to confine factitious ideas to the status of figments of the imagination, as if the mind were not capable of any other sort of "making" (this does not rule out, obviously, that this creative dimension of the mind might possibly be best exemplified by the fanciful products of the imagination). One should always bear in mind that Descartes in quite a few occasions refers to "factitious" (*factitiæ*) ideas simply as the ideas that are "made" (*factæ*) by the subject.[15] What characterizes the ideas of this class is their being

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considero, statim agnosco perexiguam illam & valde finitam in me esse, simulque alterius cujusdam multo majoris, imo maximae atque infinitæ, ideam formo, illamque ex hoc ipso quod ejus ideam formaro possim, ad Dei naturam pertinere percipio. Eadem ratione, *si facultatem recordandi vel imaginandi*, vel quaslibet alias examinem, nullam plane invenio, quam non in me tenuem et circumscriptam, in Deo immensam, esse intelligam. Sola est voluntas, sive arbitrii libertas...". In the light of Descartes' all other statements on the matter, the text is yet to be interpreted only as claiming that all man's faculties – *voluntas* aside – are finite (as clearly attested by man's limited capacity to imagine), whereas all God's are infinite. Being God incorporeal, though, imagination is simply not a candidate, despite Descartes' infelicitous phrasing taken in isoltation could suggest otherwise.

[11] An exception, though, in an early letter To Mersenne, 15 April 1630; AT I 146, 4-10.

[12] Cf. *Géometrie*, AT VI 453, 23 - 454, 7; 461, 1-7.

[13] To Regius, 24 May 1640; AT III 68: "malim etiam vero nomine Descartes, quam ficto Cartesius vocari". Cf. *Meditationes* VI; AT VII 77, 14-16.

[14] Cf. *Meditationes* I; AT VII 20, 6.

[15] Cf. To Mersenne, 16 June 1641; AT III 383. *Annotationes*; AT XI 655.

freely *produced* by the subject, not an alleged intrinsic falsity, as the current meaning of the term "factitious" – and all the more "fictitious" – is likely to suggest to an English reader.

That there might be factitious ideas which are not fabricated by the imagination is, however, not just a logical possibility opened up by an unintended lapse in Descartes' definition. Descartes contrasts, in fact, adventitious ideas with the ones "that I have formed, deliberately and thoughtfully, through meditating" (*quas ipse prudens & sciens meditando effingebam*), and this careful meditation is definitely not, according to Descartes, something that could possibly be performed by the imagination.[16] The ideas that the mind can come up with do not need to be only a distraction for it. Factitious ideas might indeed direct the mind's search for truth. Sometimes, as a matter of fact, they represent some of its greatest scientific achievements.[17]

A first, tremendous instance of non-imaginative factitious ideas that are assembled *per figmentum intellectus* might already be found in the *First Meditation*, where Descartes discusses one of the most daring hypotheses of his metaphysics: the existence of a deceiving God. The Scholastic sources of this notion are well documented, and the meditating subject recalls, in fact, an "inveterate belief" (*vetus opinio*) that speaks of an omnipotent God – a God, accordingly, who could easily succeed in deceiving him. The meditating subject wants yet to figure out whether this notion, introduced as a *cultural product* he inherited, can be rationally justified.[18] As for its content, Descartes is clear that this notion results from combining the innate idea of an omnipotent God with the notion of deception.[19] Imagination has of course nothing to do with

[16] *Meditationes* VI; AT VII 75, 16-17. A few lines later Descartes makes it explicit that the ideas that he is speaking about are made by the pure mind, i.e. by the intellect.

[17] Although Descartes defined his theory of ideas with respect to objects and it is problematical whether it could be adapted in such a way as to come also to apply to states of affairs, the *Meditations* suggest, in fact, that all hypotheses should count as instances of this class of ideas. The systematic use of *fingere* also in this context, however, suggests that Descartes was at least implying a link between the two issues. Cf. *Meditationes* III; AT VII 46, 12-14: "Est, inquam, haec idea entis summe perfecti & infiniti maxime vera; nam quamvis forte *fingi* possit tale ens non existere, non tamen *fingi* potest ejus ideam nihil reale mihi exhibere" (emphases added); *Ibid.* 50, 11-16. The construction of alternative scenarios has most in common with the fabrication of imaginary beings that never existed in the actual world and some contemporary theorists of counterfactuals are indeed pointing precisely at the imagination as the faculty in charge of devising them. Descartes, given his theory of the imagination as essentially restricted to material objects, would nonetheless resist this last association, by pressing the distinction between imaginative and factitious ideas.

[18] *Meditationes* I; AT VII 21, 1-3. For Descartes' Scholastic sources on the subject, see Tullio Gregory, "Dio ingannatore e Genio maligno: Note in margine alle *Meditationes* di Descartes", *Giornale critico della filosofia italiana* 53 (1974): 477-516.

[19] *Meditationes* III; AT VII 52, 2-9. Cf. Deborah Boyle, *Descartes on Innate Ideas*, 38-39.

such an idea, which is as removed as far as possible from anything corporeal. The progress of the *Meditations* will eventually reveal that the idea of an absolutely perfect being is inconsistent with this being's being deceptive. This factitious idea (of the understanding) is therefore to be discarded. Once again, however, it has not to be concluded that factitious ideas are necessarily false, the intellectual not less than the imaginative ones. By "putting together" (*componi*) the idea of God and the idea of the mind, Descartes argues, in fact, that one could forge the idea of an angel, something which he finds perfectly legitimate (not for a Calvinist theologian like Revius, though, who objected that angels are not to be conceived as θεάνθρωποι).[20] Descartes is also reported by Burman to have maintained that idea of the Trinity too is factitious, "formed" as it is from the (innate) ideas of God and of the number three.[21] Arguably inspired by this passage (the only extant copy of the *Conversation with Burman* was found among his manuscripts), in his comment of the *Meditations* Clauberg explicitly argued that factitious ideas can be made up from innate ones.[22]

One does not need, however, to recur to these theological concepts, be they feigned or not, to prove that factitious ideas do not coincide with the products of the imagination. A decisive piece of evidence in favor of this reading is offered by a letter in which Descartes, while still collecting the scattered objections from Mersenne's Circle (which were eventually to be gathered together into the *Sixth Set*), glosses, adding a few alternative examples, the taxonomy advanced in the *Third Meditation*:

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[20] Cf. *Meditationes* III; AT VII 43, 5-9. *Responsiones* II; AT VII 138, 27 - 139, 4. *Conversation with Burman*; AT V 157. For the objection see Jacobus Revius, *Analectorum Theologicorum Disputatio XXIII: De Cognitione Dei, Tertia* (Leiden: Johannes Nicolai 1647), XV. Jacobus Revius, *A Theological Examination*, 86.

[21] Cf. *Conversation with Burman*; AT V 165; K 347*: "Even though the idea of the Trinity is not innate in us to the extent of giving us an express representation of the Trinity, none the less the elements and rudiments of the idea are innate in us, as we have an innate idea of God, the number 3, and so on. It is from these rudiments, supplemented by revelation from the Scriptures, that we easily form a full idea of the mystery of the Trinity and understand the notion so formed (*Trinitatis ideam formamus, et illud sic formatum concipiamus*)"; cf. To Mersenne, 31 December 1640; AT III 274. For a history of the text see Hans Werner Arndt ed., *Gespräch mit Burman* (Hamburg: Meiner 1982).

[22] Cf. Johannes Clauberg, *Paraphrasis in Renati Des Cartes Meditationes de prima philosophia* (Duisburg: Wyngaerden 1658) in Id., *Opera omnia philosophica*; reprint (Hildesheim: Olms 1968), I 391 §51: "Ac denique Cerberus triceps, mons aureus, corpus quod sit ens summè perfectum à me ipso finguntur, quatenus mens mea componit seu conjungit vel cogitationes adventitias aliter atque advenisse, ut in duobus prioribus exemplis, vel innatas aliter ac innatas experitur, ut in exemplo tertio". Descartes rejects the notion of an "absolutely perfect body" in *Responsiones* II; AT VII 138, 11-26.

> I use the word "idea" to mean everything that can be in our thought, and I distinguish three kinds. Some are adventitious, such as the idea we commonly have of the sun. Others are made, or factitious, in which class we put the idea that the astronomers construct of the sun by their reasoning (*font du Soleil par leur raisonnement*). Others are innate, such as the idea of God, mind, body, triangle, and in general all those which represent true, immutable, and eternal essences.[23]

The passage provides a decisive piece of evidence that helps to cut off factitious ideas from the sphere of the imagination, since *raisonnement* and *rationes* are without a doubt beyond the scope of this latter faculty. It demonstrates once and for all, moreover, that factitious ideas do not have to be inevitably tied to error: Kepler's idea of the sun could perhaps be called a "made" idea, but it has definitely not been "made up". One should not, however, be puzzled by Descartes' claim that the astronomical idea of the sun is factitious: Descartes' criterion for an idea to count as "made" is indeed quite minimal, since it does not require an idea's content to be outlandish, but only that its formation could not possibly be explained without a contribution, even a minor one, from the side of the will, such as the initial decision of the subject to work out this one idea. Carrying out the calculations required to determine the size of the sun are indeed an activity on the subject's part, which is free to abandon it at any time. It is, in fact, undeniably up to the subject to resolve to devote his life to astronomy, so to be able to figure out the real dimensions of a star, whereas the eyes that such a subject has possessed since birth entirely suffice for him to be struck by the light proceeding from the said star and, thereby, to acquire the adventitious idea of the same celestial body.[24] It is moreover only by

[23] To Mersenne, 16 June 1641; AT III 383; K 183*. The everyday idea and the astronomical idea of the sun had already been contrasted by Descartes in the *Third Meditation*, although there he was more ambiguous on the status of the latter, which was said to be "inferred by means of astronomical reasoning, that is, derived from certain notions which are innate in me, or else made by me in some other way" (*ex rationibus Astronomiæ desumptam, hoc est ex notionibus quibusdam mihi innatis elicitam, vel quocumque alio modo a me factam*). Astronomers must indeed rely on mathematics to gauge the true dimensions of celestial bodies, so that there is a very strong sense in which this idea originates at least in part from innate truths; cf. *Meditationes* III, AT VII 39, 18-26.

[24] A full account of this claim should also consider Descartes' theory of the so-called third grade of perception and, more specifically, Descartes' thesis (especially defended in the *Sixth Set of Replies*; see §27) that the determination of a body's size requires a judgment which, in turn, Descartes takes to be the outcome of a voluntary activity (all mental activities, as already pointed out, are for Descartes volitional in nature). Descartes, however, also thinks that the subject does not carry on judgments of this sort at any time, but argues that in the vast majority of cases the perceiver simply *remembers* (without being aware of being remembering) the outcome of a similar judgments he had already passed before. According to Descartes, the perceiver does not therefore always actively calculate the dimensions of the sun the way astronomers do, but comes to perceive the sun to be of a certain size because of an association of ideas of which he is not aware and over which he was no control, so that also an astronomer, while

classifying the astronomical idea of the sun as factitious that Descartes could make room for the different astronomical estimation of the Sun's dimensions and, more in general, for the differences between Tycho's, and Kepler's, and his own idea of the sun, all of which are without doubt neither innate nor adventitious (which one, if any, is true is, of course, another issue). Descartes, finally, accounted for the Scholastic notions of real qualities and substantial forms as having been illegitimately "put together, or constructed by myself" (*a me conflatas effictasve*) from the idea of body *and* the idea of mind, the latter of which – as made clear above – escapes for Descartes the domain of the imagination.[25]

Factitious ideas, therefore, may for Descartes be made by the imagination or by the understanding, may represent beings and states of affairs that had never taken place in the real world, or stand out as the exemplary models of a rigorous science. All that matters for factitious ideas is that they must have been made by the subject. Factitious ideas and the ideas of the imagination do indeed correspond to different kinds of notions.

looking at the sun, could not help stopping to perceive it as smaller than the earth, although he knows for sure that this is not the case. Descartes might thus speak of an adventitious idea of the sun also as far as the sun's size is concerned.

[25] Cf. *Responsiones* VI; AT VII 442, 30 - 443, 6; CSM II 298. On Descartes' understanding of these notions, see §17.

§8. Sensory *vs.* imaginative ideas

Not all factitious ideas are therefore imaginative, for Descartes. Nor are all imaginative ideas made by the mind: indeed, some of them are adventitious. According to Descartes, as already pointed out, imagination is not in fact only responsible for bringing about image-like ideas patterned after the mind's innate notions of geometrical objects, but also for dreams, rêveries, hallucinations and so forth, all of which fall without doubt into the class of adventitious ideas. As Descartes remarks, one happens in fact to imagine all of them "against his will", as far as both the occurrence and their content is concerned.[1] Descartes argues that the class of imaginative ideas is in fact to be divided into two sub-sets:

> *Imaginings and other thoughts formed by the soul*
> When our soul applies itself to imagine something that does not exist, as in representing to itself an enchanted place or a chimera, and also when it applies itself to consider something that is purely intelligible and by no means imaginable (as in considering its own nature, for example), the perceptions it has of these things depend chiefly on the will, which makes the mind perceive them. This is why we usually regard these perceptions as actions, rather than passions.
>
> *Imaginings which are caused solely by the body*
> Among the perceptions caused by the body, most of them depend on the nerves. But there are some which do not and which, like those I have just described, are called "imaginings", although in this case our will plays no role in their formation (*nostre volonté ne s'employe point à les former*). Therefore, they cannot be numbered among the actions of the soul, for they arise simply from the fact that the spirits, being agitated in different ways and coming upon the traces of various impressions which have preceded them in the brain, make their way by change through certain pores rather than others. Such are the illusions of our dreams and also the day-dream we often have when we are awake and our mind wanders idly, without applying itself to anything designedly (*de soy-mesme*).[2]

Within Descartes' system, the claim that some ideas of the imagination are adventitious makes perfect sense. The "I" *out of which* adventitious ideas are said by Descartes to come is in fact a disembodied mind, not a person made of flesh and bones. Therefore, all ideas caused by

[1] *Meditationes* II; AT VII 28, 27-28; CSM II 19. Cf. *Passions* I 21; AT XI 344, 15 - 345, 15.

[2] *Passions* I 20-21; AT XI 344, 1 - 345, 5; CSM I 336*. Intellectual notions are here said to "depend chiefly on the will" inasmuch as the subject is free to think of them *ad arbitrium*, as already pointed out in §3 for innate notions (to which the article of the *Passions* implicitly refers). The same holds of course true *a fortiori* for intellectual factitious ideas.

the body to which the mind happens to be conjoined (as is the case for dreams and hallucinations, natural appetites and passions) are for Descartes as external to the mind as is the light coming from a distant star, simply because a mind is not located in space.[3] In order to prove that the outside world exists – a world, that is to say, external to a non-extended subject (*extra me*) – it would thus have been enough for Descartes to prove that such a "personal" body exists.[4] The aborted proof based on the subject's power to bring about image-like ideas was indeed concerned with nothing but this body and, actually, not even with the entire assemblage of our limbs as we know it. A brain, according to Descartes, would indeed be enough to account for the aspectual character of factitious imaginings (foreshadowing thereby the so-called problem of a brain-in-a-vat). The reason why Descartes came to reject this proof was in fact only because it did not meet his standards for metaphysical inferences, not because of its restriction to a body that most of Descartes' contemporaries would have vehemently refuted to qualify as "external" to the subject under any regard.[5] Descartes, as shown, thought that the conclusive piece of evidence was provided by adventitious ideas but, here again, the most visceral sensation of pleasure or pain works for him as well as the far-off reddish light of Betelgeuse, might it have been truly perceived or only dreamt about. Whereas the "supposed annihilation of the universe" which launches Hobbes' philosophy leaves him with "a man" (*homo aliquis*), Descartes' doubt does indeed also erase man's body, to find itself with nothing but a *mens*.[6] Accordingly, when Descartes argued against "those, if there is still anybody, who are not sufficiently convinced of the existence of God and of their soul by the arguments I have proposed… that everything else of which they may think themselves more sure is less certain", he mentioned as instances of these "less certain" claims both "their having a body" and "there being stars and an earth, and the like".[7]

As already pointed out, Descartes' reasoning for proving that material objects exist is indeed based on considering a class of ideas whose occurrence in the timeline of thoughts and

[3] Cf. *Discours* IV; AT VI 33, 4-6; CSM I 127: "a substance whose whole essence, or nature, is simply to think… does not require any place (*lieu*) or depend on any material thing to exist".

[4] *Meditationes* III; AT VII 35, 26.

[5] In force of the doctrine of mind-body union Descartes too, actually, restricts in many occasions "external" to the bodies outside the personal one, as when he contrasts the external with the internal senses; see for example the headings of *Passions* I 23 and I 24: "Des perceptions que nous rapportons aux objets qui sont hors de nous" *vs.* "Des perceptions que nous rapportons à notre corps"; AT XI 346-47.

[6] Cf. Thomas Hobbes, *De Corpore* II 7, 1-2: "ficta universi sublatio", "supposita rerum annihilatio". On the issue, see Aldo G. Gargani, *Hobbes e la scienza* (Torino: Einaudi 1971), 134-48.

[7] *Discours* IV; AT VI 37, 24-30; CSM I 129.

representative content are both *given*, but in which no distinction is (and can) initially been made between (what will turn out to be) on the one hand sensory and, on the other, imaginative ideas and which have accordingly been collectively designated as the *adventitious imaginative-sensory* ideas. Descartes' reasoning from the subject's power to passively *receive* ideas of this sort to the existence of material objects has already been spelled out in §2, which had shown how Descartes intended to establish this metaphysical thesis by means of an in-depth investigation into the subject's will, whose transparency would have rejected the hypothesis of any unconscious faculty by which the mind would be giving all adventitious ideas to itself, as it were.[8]

It is however crucial to notice that, by simply proving that material objects exist, Descartes has not thereby supplied with criteria for distinguishing between sense-perceptions and dreams (and, more in general, adventitious imaginings). As Descartes points out, formulating in physiological terms what the dream argument had already made clear from the perspective of the mind, "everything the soul perceives by means of the nerves may also be represented to it through the fortuitous course of the spirits".[9] In Descartes' views sense-perceptions and involuntary imaginings are indeed indistinguishable not only as far as the subject's ability to modify their occurrence and content is concerned, but also in case one takes into closer account their actual representative content and aspectual character (which, on the other hand, has permitted Descartes to discriminate between intellectual and image-like ideas).

Descartes suggests sometimes that "the impressions that come into the brain through the nerves are *normally* more lively and more definite (*plus vives & plus expresses*) than those produced by the spirits", but he always insists that these are only standard cases, which admit plentiful of exceptions. As a matter of fact "often, when we sleep, and sometimes even when we are awake, we imagine certain things so vividly (*si fortement*) that we think we seem them before us… although they are not there at all", and the dream argument of the *First Meditation* starts precisely by refuting the claim that dreams would always be "not as distinct" as sense-perceptions.[10]

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[8] See the already-quoted key passage from To Hyperaspistes, August 1641; AT III 428-29; K 193: "I proved the existence of material things not from the fact that we have ideas of them, but from the fact that these ideas come to us in such a way as to make us aware that they are not produced by ourselves, but come from elsewhere".

[9] *Passions* I 26; AT XI 348, 10-13; CMS I 338*.

[10] *Ibid.* AT XI 348, 14 - 349, 3; CMS I 338. Cf. *Meditationes* I; AT VII 19, 16-17; CSM II 13. Analogously in *Discourse* V; AT VI 40, 12-15; CSM I 131*: "imaginings in sleep are as or even more lively and definite (*vives & expresses*) than in waking life". It must be noticed that when, in *Sixth Meditation*, Descartes presents the arguments that made him previously confident in the existence of material objects by pointing out that "the ideas perceived by the sense were much more lively and vivid and even, in their own way, more distinct than any of those which I have formed,

Descartes, actually, remarks that the thoughts that occur during sleep can be "more noticeable and perceptible" (*plus remarquable & plus sensible*) than those that occur while awake and even tries to work out a physiological explanation of why "if stung by a fly when we sleep, we dream that someone has stubbed us with a sword; or if we are not adequately covered, we imagine ourselves quite naked; or if we are covered with a little too much, we think ourselves weighted down by a mountain", all cases in which being asleep intensifies, rather than diminishing, an otherwise quite unremarkable sensory stimulus.[11] Descartes, accordingly, concludes that sense-perceptions and imaginings cannot be told apart on the basis of an alleged difference in "vivacity", thereby rejecting any distinction along Hume's lines. "As I think about the issue more carefully", he writes in the *First Meditation*, "I see plainly that there are never any sure signs by means of which being awake can be distinguished from being asleep".[12]

In order to distinguish between sense-perceptions and the (adventitious) figments of the imagination, Descartes argues in the *Sixth Meditation* that the subject must indeed move beyond the individual ideas to investigate how they relate to what precedes and what comes after them in experience. Whereas some (most, as a matter of fact) adventitious ideas happen indeed to follow from the previous ones in an orderly succession, others pop up randomly. In both cases the subject has no control over the stream of his ideas – neither over its unfolding, nor over its content – but in the former case he can at least make sense of this stream, by connecting in a meaningful succession the different ideas that follow one another in his consciousness. This cannot of course be done in case (for example) he was to unexpectedly and incomprehensibly find a book in front of himself, or even in his hand "sans sçavoir qui l'y avoit mis", which was furthermore to suddenly disappear "sans sçavoir qui le lui avoit apporté":[13]

> I now notice that there is a vast difference between being asleep and being awake, in that dreams are never linked by memory with all the other actions of life as waking experiences are. Indeed, if, while I am awake, anyone were suddenly to appear to me and then disappear immediately, as happens in dreams, so that I could not see where he had come from, or where he had gone to, it would not be unreasonable for me to judge that he was a ghost, or a phantom made in my brain (*spectrum potius, aut phantasmata in cerebro meo effictum*) rather than a real man. But when I distinctly see from where and when things come

deliberately and thoughtfully, through meditating" (AT VII 75, 14-17; CSM II 52*) he is not opposing sense-perceptions and imaginings, but sensory – and, implicitly, imaginative – perception and abstract cognition.

[11] Cf. *Homme*; AT XI 198, 14-25; Hall 109. See also *Discourse* V; AT VI 38, 9-11.

[12] *Meditationes* I; AT VII 19, 19-21; CSM II 13*.

[13] From Baillet's report of Descartes' well-known dreams on the night of 10 November 1619; cf. AT X 182-84.

to me (*mihi adveniant*), and I can connect my perceptions of them with the whole of the rest of my life without a break, then I am certain that these occur to me while I am awake, rather than asleep.[14]

The construction of such an order of Nature is indeed the culminating accomplishment of the *Meditations*, which reach their end as soon as they can dispel the only doubt left: the impossibility of distinguishing between sensory and imaginative adventitious ideas, on which the dream argument was based. And it is indeed with these words, after pointing out that the needs of our practical life do not always allow us to inspect all matters as carefully as they should, that the *Meditations* end. Descartes, in his views, had in fact eventually managed to articulate the entire system of the faculties and to explain why it would have been an error to take the distinction between intellectual, imaginative and sensory ideas to coincide with another threefold distinction he had drawn on a completely different basis and for quite different purposes, namely, the one between innate, factitious and adventitious notions. *Distingue frequenter*, read a Scholastic motto against which Descartes reacted many a time with cross impatience. In this case, though, it would have been his turn to react against most of his interpreters by insisting that if he had drawn *two* taxonomies of ideas, by painstakingly distinguishing between the classes of ideas so obtained and investigating the relation between the two throughout six *Meditations*, this had not been done without a reason.

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As the reference to a *phantasmata in cerebro* in the passage quoted above makes clear, a fully-fledged articulation of Descartes' criteria to distinguish between adventitious sensory and adventitious imaginative ideas would have to take advantage of his physiology. Descartes was fully aware of this point and as a matter of fact in the *Sixth Meditation* he referred the readers to the "countless observations (*innumera experimenta*), that there is no need to review here" in order

[14] *Meditationes* VI; AT VII 89, 20 - 90, 6; CSM II 61-62*. This explains why, in the *Synopsis* to the work that present the topics covered by the *Sixth Meditation*, "all the arguments from which can be proven the existence of material objects" are listed by Descartes only at the very end, even though in the *Sixth Meditations* the proof that there are material objects precedes both *de facto* and *de jure* the analysis of sensory errors; cf. *Meditationes, Synopsis*; AT VII 15, 20 – 16, 3; CSM II 11*. This also explains why Descartes speaks there of *rationes omnes*, even though the proof that there are external objects is just *one* argument. Descartes, indeed, makes clear that the "arguments" he is referring to prove not only that humans beings have their own bodies, but that there is an entire world (*aliquem mundum*), a claim that cannot yet be rigorously established without ruling out the possibility that we are always dreaming. And, as a matter of fact, *this* claim is established by Descartes only at the very end of the *Sixth Meditation*.

to explain away perceptual errors by appealing to the intrinsic limitations of any mechanical system and, more specifically, of the constitution of the nerves, the brain and of the "small part of it" to which the mind should be joined: the infamous pineal gland.[15] Descartes' move was perfectly legitimate, since by proving that the external world exists he had also finally been able to restore the scientific validity of physics and of all its sub-disciplines which, contrary to what happened with *pura mathesis* (whose demonstration "have no concern" with whether their objects exist outside the mind or not), could not resist the dream argument and the hypothesis that there are no bodies: the subject-matter of physics are indeed precisely these very concrete objects.[16]Among the disciplines subordinated to physics there is yet also physiology, *viz.* the study of the constitution and functioning of a living body. In a book entitled *Meditationes de prima philosophia* Descartes could not however but *state* the results of his empirical researches, with are indeed presented quite abruptly and at a first glance might even sound quite *ad hoc*.

The second part of this work argues that this is actually not the case, and that the link between Descartes' metaphysics and his physiology is actually way deeper that one might think: it is indeed precisely by relying on his physiology that Descartes intended to establish a crucial piece of his philosophy: the claim that bodies are *nothing but* extended things, that is, that they are not colored as we perceive them to be (and so for all other proper sensibles). As the next part of this work points out, in the *Meditations* Descartes in fact only thought to have established that bodies are indeed extended things, so that they do have an extension – obviously enough – and all the other properties deducible from extension, such as having a shape, being in motion or at rest and the like.

These topics will be treated as they deserve in due course, and the second part of this work will show how sophisticated the specifics of Descartes' physiology are and, accordingly, why they cannot be adequately presented here. Before concluding the chapter is however worth presenting at least the gist of the theory, not so much for its own sake, as to make fully clear, at last, how Descartes' distinction between innate, factitious and adventitious ideas relates from an extensional point of view with the distinction between intellectual, imaginative and sensory ideas. Descartes' most terse exposition of his physiology is probably to be read in a letter to

[15] *Meditationes* VI; AT VII 86, 22-23; CSM II 60*. According to Descartes errors of this sort should not therefore be blamed on God: contrary to reason, which is a "universal instrument" (*Discours* V; AT VI 57, 9) a physiological system, being material, is not in fact flexible enough to account, for instance, for the difference between a stimulation of the end of the nerve that goes to the foot and a stimulation of some other portion of the same nerve "in its route from the foot to the brain", thereby making possible illusions such as the phantom limb; cf. *Meditationes* VI; AT VII 87, 19 - 89, 7; CSM II 60-61. For more on the issue, see §20.

[16] See the already-quoted *Meditationes* I; AT VII 20, 20-30; CSM II 14*.

Elisabeth, which will find its way to the *Passions of the Soul* and that, once integrated with what Descartes says elsewhere about fixations and his quite thorny account of memory – both voluntary and involuntary – provide an excellent survey of his physiology.[17] Although the letter

[17] For Descartes madness (at least some forms of it) and fixations result from impressions fixed on the pineal gland – i.e. on the imagination understood as an organ – which presents therefore the subject with the same idea over and over again rather than properly reacting as confronted with the stimuli coming from the nerves and, thereby, from external objects. In Descartes' views, fixations would thus in the end be nothing but a *rêverie* the subject is not able to get rid of notwithstanding his most motivated attempts. A fanciful account, indeed, but at bottom level Descartes is simply claiming – quite reasonably – that madness and analogous disorders result from a brain damage. On the meaning of Descartes' reference to madness in the *First Meditations* against Foucault's famous reading, see Jean-Marie Beyssade, *Descartes au fil de l'ordre* (Paris: Presses Universitaires de France 2001), 13-48. Descartes' account of memory is, on the other hand, more problematic or, at least, incomplete. Descartes has a quite elaborated physiological theory of how memory traces are "stored" in the brain and can be reactivated. This can happen, according to Descartes, either because the subject himself freely decides to recall something or simply by virtue of the ordinary brain activity (it should be noted that the line relative to voluntary memory in the scheme presented here is dashed since a memory, even if voluntary, can hardly be regarded as a *factitious* idea). This is indeed what happens in dreams and daydreaming, which for Descartes depend precisely on the memory traces stored in the brain, sometimes variously deformed by the "movement of the spirits". Descartes must therefore provide a criterion for distinguishing between a *rêverie* and an involuntary memory, *viz.* between a mere imagining and an imagining which is acknowledged to be the result of a previous sense-perception. Such an acknowledgement, according to Descartes, cannot yet be explained physiologically but requires "a certain reflective act of the intellect, or intellectual memory"; cf. To Arnauld, 4 June 1648; AT V 192-93. See also To Arnauld, 29 July 1648; AT V 220; K 356: "If we are to remember something, it is not sufficient that the thing should previously have been before our mind and have left some traces in the brain which give occasion for it to occur in our thought again; it is necessary in addition that we should recognize, when it occurs the second time, that this is happening because it has already been perceived by us earlier. Thus, verses often occur to poets which they do not remember ever having read in other authors, but which would not have occurred to them unless they had read them elsewhere. From this it is clear that it is not sufficient for memory that there should be traces left in the brain by preceding thoughts. The traces have to be of such a kind that the mind recognizes that they have not always been present in us, but were at some time newly impressed. Now for the mind to recognize this, I think that when these traces were first made it must have made use of pure intellect to notice that the thing which was then presented to it was new and had not been presented before; for there cannot be any corporeal trace of this novelty". It is however only in his late letters to Arnauld that Descartes expressly argues that, in order for an imagining to be recognized as a memory (as opposed to a daydream, for example, or to a hallucination) "a certain reflective act of the intellect, or intellectual memory" is required. In Descartes' previous writings, on the other hand, the issue had never been addressed, and the distinction between memories and imaginings seems to have been simply taken for granted. Desmond Clarke contested Descartes' claim that the recognition of the novelty of an idea is to be attributed to the understanding, arguing that it would have been enough for him to appeal to the passion of wonder as described in *Passions* II 70-73, 75; CSM I 353-55; cf. Desmond Clarke, *Descartes's Theory of Mind* (Oxford: Clarendon Press 2003), 99-105. Clarke's reading had been convincingly refuted by Dennis Des Chene, "Review Essay: *Descartes's Theory of Mind* by

is mostly concerned with working out a proper concept of "passion", so that intellectual and innate ideas are not even mentioned and the terms "factitious" and "adventitious" never show up expressly, what has been said so far has made clear enough how to understand Descartes' talk of an "action" and a "passion" of the mind – or, as he usually refers to it in his French writings of the time, of the *âme*:

> I think various impressions are formed in the brain of animals: some by the external objects that move the senses, and others by the internal dispositions of the body, either by the traces of previous impressions left in the memory, or by the agitation of the spirits which come from the heart. Or, in man, by the action of the soul, which has some power to change the impressions in the brain, just as these impressions in their turn have the power to arouse thoughts in the soul which do not depend on the will. Consequently, the term "passion" can be applied in general to all the thoughts which are thus aroused in the soul by the impressions that are in the brain alone, without the concurrence of its will, and therefore without any action of the soul itself. For whatever is not an action is a passion. Commonly, however, the term is restricted to thoughts which are caused by some special agitation of the spirits. For thoughts that come from external objects, or from internal dispositions of the body – such as the perception of colors, sounds, smells, hunger, thirst, pain, and the like – are called "sensations", the former "external", "internal" the latter. Those that depend solely on the traces left by previous impressions in the memory and the ordinary movement of the spirits are *rêveries*, whether they are real dreams in sleep or daydreams in waking life when the soul does not determine itself of its own, but idly follows the impressions that happen to be in the brain. But when the soul uses the will to determine itself to some thought which is not just intelligible but also imaginable, this thought makes a new impression in the brain; this is not a passion within the soul, but an action, and this is what is properly called "imagination". Finally, when the normal flow of the spirits is such that it commonly arouses sad or cheerful thoughts or the like, this is not attributed to passion, but to the nature or humor of the person in whom they are aroused; and, accordingly, one person is said to have a sad nature, another to be of a cheerful humor, and so on.[18] So there remain only the thoughts that come from some special agitation of the spirits, whose effects are felt as in the soul itself. It is these that are "passions" properly so called.[19]

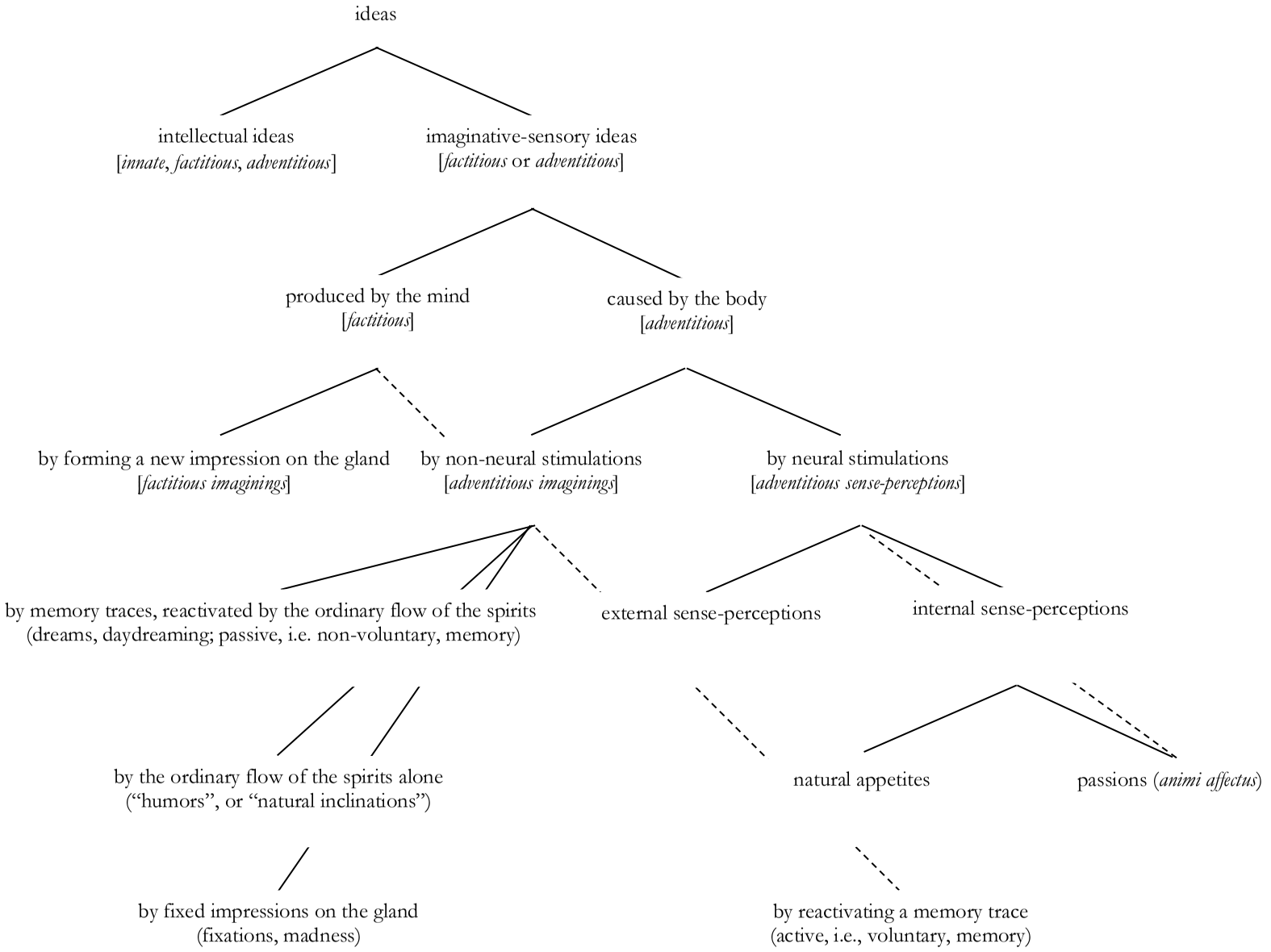
Desmond Clarke", *Oxford Studies in Early Modern Philosophy* 3 (2006): 325-27. I agree with most of Des Chene's objections, although I think Descartes also had properly epistemological reason to posit such a non-corporeal memory (clearly expressed in the letter to Arnauld quoted above), besides the obvious theological ones. Coherently with the general plan of the work, in his long study on memory impressions John Sutton does not deal with intellectual memory, which he touches upon only to dismiss it as a theological remnant; cf. John Sutton, *Philosophy and Memory Traces: Descartes to Connectionism* (Cambridge: Cambridge University Press 1998).

[18] For Descartes' theory of "humeurs ou inclinations naturelles", see *Homme*; AT XI 166, 14 - 167, 29; Hall 72-73.

[19] To Elisabeth, 6 October 1645; AT IV 310, 5 -311, 23; K 270-71*. For Descartes' theory of the passions as defended in the 1649 treatise – where Descartes makes clear what this "special agitation" of the spirits would consist in and how relates to the neural stimulations coming from the hearth – see Desmond Clarke, *Descartes's*

In the light of Descartes' physiology, the relation between the two threefold taxonomies of Descartes' mature theory of ideas – intellectual, imaginative and sensory on the one hand; innate, factitious and adventitious on the other – is thus to be portrayed as follows:

Theory of Mind 106-34. Clarke proposes therein a scheme of Descartes' taxonomy of the actions and passions of the mind (basically the same of CSM II 338) as defended in the *Passions of the Soul*. The scheme presented here differs inasmuch as is intended to make clear how the distinction between factitious, innate and adventitious ideas relates with the one between intellectual, imaginative and sensory ideas, rather than being concerned with the *Passions of the Soul* specifically (accordingly, it also intends to account for fixations, humors, and memory, which are not discussed explicitly in the 1649 treatise and that, as a consequence, both Clark and the CSM edition do not consider). It should be noticed, moreover, that after the *Principles* Descartes does no longer treat passions as one instance of internal sense-perceptions (together with natural appetites); see the already quoted *Principia* IV 190; AT VIII-1 316, 12-14; CSM I 280* (in this article, to be fully accurate, Descartes speaks of *animi affectus*, rendered yet as *passions* in the French authorized translation; cf. AT IX-2 311). Accordingly, by following Descartes' classification of ideas after 1644 (already advocated in the letter to Elisabeth just quoted), internal sense-perceptions should be restricted to natural appetites, and passions immediately listed alongside these appetites and external sense-perceptions, as suggested in the scheme by the dotted line.


ideas
intellectual ideas
[*innate*, *factitious*, *adventitious*]
imaginative-sensory ideas
[*factitious* or *adventitious*]
produced by the mind
[*factitious*]
caused by the body
[*adventitious*]
by forming a new impression on the gland
[*factitious imaginings*]
by non-neural stimulations
[*adventitious imaginings*]
by neural stimulations
[*adventitious sense-perceptions*]
by memory traces, reactivated by the ordinary flow of the spirits
(dreams, daydreaming; passive, i.e. non-voluntary, memory)
external sense-perceptions
internal sense-perceptions
by the ordinary flow of the spirits alone
("humors", or "natural inclinations")
natural appetites
passions (*animi affectus*)
by fixed impressions on the gland
(fixations, madness)
by reactivating a memory trace
(active, i.e., voluntary, memory)

[§§9-11] Clear and Distinct, Obscure and Confused Ideas

The section studies Descartes' concept of a clear and distinct perception with regards to the ideas of material objects ("perception" and "idea" being conceived by Descartes – and, accordingly, in what follows – as perfectly equivalent terms). §10 and §11 are thus respectively devoted to the concepts of clear and of distinct perception, and study how these two notions relate to their opposites: obscure perceptions on the one hand, confused perceptions on the other. As these chapters show, clarity and distinction are unable to establish Descartes' celebrated distinction between two classes of ideas of bodies (exemplified throughout the chapter by color-ideas and shape-ideas), since according to Descartes *any* idea can be apprehended in a clear and distinct way. The section points out that the well-known distinction between these two classes of ideas has in fact been established by Descartes by means of his theory of the mind's faculties. Descartes' speaking of "clear", "distinct", "obscure" and "confused" ideas of material substances can (and is indeed to) be restated in terms of "sensory", "imaginative", and "intellectual" ideas: Descartes made in fact use of the former notions only to convey in a few words a complex line of reasoning entirely based on the system of the theoretical faculties of the mind. The opening §9 shows that Descartes couched in terms of "clear and distinct perceptions" an argument essentially based on the theory of the mind's faculties not only so far as the ideas of material substances are concerned: the same applies in fact to Descartes' theory of knowledge of the basic metaphysical principles, that is, of what is most remote from being a body (if any). Descartes defended in fact the truth of these notions by arguing that the *faculty* responsible for perceiving them cannot but be taken to be reliable, inasmuch as "there cannot be another faculty I can equally trust as this natural light, and which could teach me that what is revealed to me by this natural light is not true" (this faculty being the so-called "natural light", which would make understood these pieces of truth by casting its light upon them, as it were). Taking its cue from this pivotal piece of Descartes' theory and from the *Meditations* argument for the existence of external bodies, the section intends to argue, on a more general level, that Descartes did not ground his philosophy a highly-selected set of *intuitions* (for how much clear and distinct they could have been) but to establish a system of *reasons*, wherein intuition is to be accepted only in case reason has proven it to be the best reason we might have. The philosopher of "clear and distinct perceptions" was indeed as far as possible from being an intuitionist, even of sorts.

§9. The rule of truth and the "natural light"

In order to bridge the gap between mind and world – between the subject's ideas and the objects these ideas are about – Descartes famously called upon what is usually referred to by scholars as his "rule of truth", which states that "whatever is clearly and distinctly perceived is true". In the *Meditations*, this philosophical principle is set forth at the beginning of the *Third*, which presents it as *regula generalis* inferred from the case of the *cogito* argument, this being the only piece of knowledge that (at that stage of the enquiry) has proven to be able to withstand all sorts of possible objections:

> I am certain that I am a thinking thing. Do I not therefore also know what is required for my being certain about anything? In this first item of knowledge (*prima cognitio*) there is simply a clear and distinct perception of what I am asserting, which of course would not be enough to make me certain of the truth of the matter if it could ever turn out that something which I perceived with such clarity and distinctness was false. So I now seem to be able to lay it down as a general rule that whatever I perceive very clearly and distinctly is true.[1]

As a matter of fact, the validation of this rule is one of the main targets of the *Third* as well as of the *Fourth Meditation*.[2] The problems with Descartes' argument to establish the validity of his "rule of truth" are well-known, and go under the name of "Cartesian Circle": Descartes intended in fact to demonstrate that God exists by appealing to the clear and distinct *idea* of this supremely perfect being, while yet arguing that it is only the existence of a supremely perfect (and, consequently, non-deceiving) God to make sure that the ideas that are perceived in a clear and distinct manner are true – *viz.* that they correspond to actual states of affairs.[3] The validation problem and Descartes' alleged way-out of the circle (provided that there can be any) have been scathingly criticized since Arnauld first pointed out the difficulty it in his *Objections*, and would deserve a study on their own.[4] This chapter does not however attempt to figure out once again

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[1] *Meditationes* III; AT VII 35, 6-15; CSM II 24.

[2] *Meditationes*, *Synopsis*; AT VII 13, 9-13; CSM II 9.

[3] To Mersenne, 16 October 1639; AT II 597; K 139: "*truth*… denotes the conformity of thought with its object".

[4] The literature on the topic is immense. For a critical survey of the main positions, see Gary Hatfield, "The Cartesian Circle" in Stephen Gaukroger ed., *Blackwell Guide to Descartes'* Meditations (Malden, MA: Wiley-Blackwell 2006), 122-41. Further developed in Gary Hatfield, *The Routledge Guidebook to Descartes'* Meditations (London - New York: Routledge 2014). For yet one more recent (and very original) attempt to deal with the problem, see Stephen J. Wagner, *Squaring the Circle in Descartes'* Meditations*: The Strong Validation of Reason* (Cambridge: Cambridge

how Descartes intended to validate the rule, and whether his argument is convincing or badly flawed. The pages that follow are rather devoted to spell out the proper *meaning* of this rule and, more specifically, to figure out what those "clear and distinct perceptions" that Descartes singled out as the cornerstones of his entire philosophy are supposed to be.

The crucial question is, of course, what would mean to perceive an idea in a "clear and distinct" way, and the following chapters study in detail these notions, in the attempt to spell out as thoroughly as possible the grounding concepts of Descartes' rule of truth. It must be pointed out right from the beginning, though, that the principle "whatever is clearly and distinctly perceived is true" was not intended by Descartes as the once-and-for-all answer to all the questions tackled in the *Meditations*, but only as the most conspicuous expression of a line of reasoning that goes deeper than the concept of a clear and distinct perception. According to Descartes, some of the "metaphysically certain" truths that constitute the body of knowledge of the *Meditations* are in fact perceived neither clearly not distinctly, their truth having to be established by some other means.

This is indeed the case with Descartes' proof that material objects exist, as presented in the *Sixth Meditation* (the argument has already been analyzed in §2, to which the reader is referred for more details). For Descartes, the subject does not in fact perceive clearly and distinctly that the ideas whose occurrence in the timeline of his thoughts and representative content cannot be freely modified by him do actually come from material objects. As Descartes remarks, the features just mentioned only establish that the cause of ideas of this sort is *not* the subject himself – i.e. that adventitious ideas are not factitious ideas in disguise – while leaving unanswered whether these ideas are brought about by external bodies (as we ordinarily take them to be) or it is some "creature nobler than body" (and, accordingly, non-corporeal at all) to present the mind with them.

Descartes claims that as a matter of fact we do however happen to have a "strong inclination" or, more literally, a "great propensity to believe" that the former is the case. He does not unfortunately say much about the nature of this *magna propensio ad credendum*, whose epistemological status remains accordingly quite uncertain.[5] Descartes implies at least clearly enough that it is *not* "by virtue of the natural light" that we apprehend that adventitious ideas are caused by material substances. This remark, however, only moves the question from the *magna propensio* to a no-less mysterious *lumen naturæ*. But what is this "natural light", and what are the objects this *lumen* is supposed to cast its light upon?

University Press 2014).

[5] *Meditationes* VI; AT VII 79, 14 - 80, 4; CSM II 55* (quoted in full and analyzed in the following pages).

As regards its object, Descartes's writings make clear that he ascribed to this natural light the perception of all metaphysical tenets, such as the causal principle that an effect cannot have a degree of reality superior to its "efficient and total" cause (since – as is always the natural light to instruct – "nothing comes nothing"; more on this in §17) or that "the distinction between preservation and creation is only a conceptual one".[6] For Descartes, moreover, it is always thanks to this natural light that we can come to know how the mind really works and how its different faculties relate: it is indeed immediately "manifest by natural light", Descartes claims, "that the perception of the intellect should always precede the determination of the will".[7] Our will, according to Descartes, gives its assent to claims of this sort precisely because of the "clarity" by which they are given to the mind by virtue of this "natural light": Descartes argues that "from a great illumination of the intellect" (*ex magna luce intellectus*) it cannot indeed but follow "a great inclination in the will".[8] "Clear" perceptions and the natural "light" are in Descartes' writings manifestly related notions, and §11 shows that the same holds true for Descartes' concept of a "distinct" perception, this too having been imported in philosophy from the theory of light and vision. Descartes, accordingly, could state in some occasions that the above-mentioned philosophical truths are detected by the natural light by casting its light upon them, as it were, and in some others (by simply inverting the terms of the question) that like pieces of knowledge force themselves upon the subject by reasons of their self-evident, manifest and luminous truth.[9] It can thus be easily explained why Descartes, while putting so much emphasis on the rule of truth in both the *Discourse* and the *Meditations*, could write in some other occasions (but in the very same years) that he took "the natural light… as the only rule of [his] truths".[10]

As for the nature of this "light", Descartes seems to use of the term as a quite traditional

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[6] *Meditationes* III; AT VII 40, 21 - 41, 1; *Ibid.* AT VII 49, 9-11; CSM II 33.

[7] *Meditationes* IV; AT VII 60, 3-5; CSM II 41. It would therefore be improper to restrict the "natural light" to metaphysical principles in the strict sense of the term.

[8] *Responsiones* II; AT VII 147, 27 - 148, 13; CSM II 105: "It should also be noted that the clarity, or transparency (*claritatem, sive perspicuitatem*), by which our will can be moved to give its assent is of two kinds: the first comes from the natural light, while the second comes from divine grace". *Meditationes* IV; AT VII 59, 1-2; CSM II 41.

[9] See for example *Principia* I 30; AT VIII-1 16, 18-22. The link between these two pieces of Descartes' philosophy – his theory of clear and distinct perception, namely, and the concept of a natural light – has of course already been pointed out by scholars; cf. Anthony Kenny, *Descartes: A Study of his Philosophy* (New York: Random House 1968), 177-78. Harry G. Frankfurt, *Demons, Dreamers, and Madmen: The Defense of Reason in Descartes's* Meditations (Indianapolis - New York: Bobbs-Merrill 1970), 212.

[10] To Mersenne, 16 October 1639; AT II 599; K 140*: "L'auteur [Herbert of Cherbury] prend pour règle de ses vérités le consentement universel; pour moi, je n'ai pour règle des miennes que la lumière naturelle".

metaphor for the *inner core of the cognitive power* (to trade one metaphor with another). This *lumen naturæ* should accordingly been regarded as the "light" by virtue of which the subject is not one more body that happens to move blindly in a world of other countless mindless bodies, but a truly extraordinary being: a cognizer. Descartes, accordingly, has never listed it alongside intellect, imagination, sensibility and memory, as if this "light" would be just one more specific *function* of the *vis cognoscens*. This "light" is rather what specifically makes of this power a *cognitive* power able to see through things – a power, namely, with an insight into things, this being a feature common to *all* theoretical faculties (being, actually, what makes of them *theoretical* faculties in the first place). Not one more function of the *vis cognoscens*, therefore, but the *vis cognoscens* in its purity and, accordingly, insofar as capable of detecting the first truths. By the same token, it can also be explained why Descartes sometimes referred to this "light" as "the *intellectual* perspicuity [or perspicacity] bestowed on us by nature" which would be "obscured" the mind's embodiment. As already pointed out in §5, in Descartes' views the intellect is in fact nothing but the cognitive power in its purity – i.e. apart from the body – so that for him it made perfect sense to attribute the subject's capacity to understand to the understanding in the strict sense of the term.[11] Descartes could in this sense qualify the "natural light" as a "faculty". Not a faculty whatsoever, though, but the mind's supreme one:

> When I say "Nature taught me to think this", all I mean is that a certain spontaneous impulse (*spontaneo quodam impetu*) leads me to believe it, not that its truth has been revealed to me by some natural light. There is a big difference here: whatever is revealed to me by the natural light – for example that from the fact that I am doubting it follows that I exist, and so on – cannot in fact in any way be open to doubt. *This is because there cannot be another faculty I can equally trust as this natural light, and which could teach me that what is revealed to me by this natural light is not true*.[12]

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[11] *Responsiones* II; AT VII 162, 28 - 163, 7; CSM II 115*: "perspicuitatem intellectus… a natura inditam". On Descartes' concept of *lumen naturale* see John Morris, "Descartes' Natural Light", *Journal of the History of Philosophy* 11/2 (1973): 169-87 and, for a critical survey of the more recent literature on the topic, see Deborah Boyle, *Descartes on Innate Ideas* (London - New York: Continuum 2009), 81-118, which aptly adjusts a few infelicitous statements of Morris' classical paper.

[12] *Meditationes* III; AT VII 38, 23 - 39, 1; CSM II 26-27* (emphasis added). See also *Principia* I 30; AT VIII-1 16, 18-19: "lumen naturæ, sive cognoscendi facultatem a Deo nobis datam". Descartes' cautions about the proper nature and scope of this "natural" light and, more in general, about the concept of "nature" were intended to make sure that his position would not have been confused with what would have later been called the philosophy of "common sense", according to which men's "natural" belief that sensory ideas are similar to their objects (Descartes' example in the passage just quoted) could be taken as an argument that bodies are *de facto* colored. Analogously for the "natural" belief that these (colored) bodies exist.

According to Descartes the "great propensity to believe" in the existence of external objects – albeit "natural" and "great" – falls short of this optimal standard, and is precisely for this reason (Descartes claims) that one can and has to keep on doubting whether it is true or nor that bodies exist even once the rule of truth has been validated. According to Descartes we do in fact apprehend neither distinctly nor clearly that there are external objects, so that the proof of their existence cannot but fall out of the purview of the *regula generalis* of the *Meditations*. The *magna propensio ad credendum* in the existence of material substances occupies thus a sort of middle ground between the two sorts of instincts distinguished by Descartes in response to Herbert of Cherbury's own theory of an *instinctus naturalis*, in a letter written at the time the *Meditations* were still under elaboration:

> I distinguish two kinds of instinct. One is in us qua human beings, and is purely intellectual: it is the natural light or mental vision (*lumière naturelle ou intuitus mentis*). This is the only instinct which I think one should trust. The other belongs to us qua animals, and is a certain impulse of nature towards the preservation of our body, towards the enjoyment of bodily pleasures, and so on. This should not always be followed.[13]

The "great propensity" discussed by Descartes in the *Sixth Meditation* cannot yet be classified as a sort of built-in reaction of the animal to the environment: it is indeed a propensity "to believe", that is to take a stance on a *theoretical* claim which has nothing to do with the animal's welfare. At the same time, though, in Descartes' views the thinker does not feel compulsorily driven to give his assent to the claim that material objects exist (or that they are colored) as soon as he is presented with it, as Descartes thinks it has on the other hand proven to be the case with metaphysical principles such as "the nothing has no properties" or the *cogito* argument. Descartes' crucial point is in fact that, even though the inclination to affirm that sense-perceptions are caused by material objects – and, thereby, that bodies exist – is "great", it is not irresistible and, indeed, the meditating subject is still doubting about the truth of this claim even

[13] See the already-quoted To Mersenne, 16 October 1639; AT II 599; K 140. From the *Meditations* onwards, Descartes will indeed make room in his philosophy for a third sort of "instinct" (although without calling it by this name), directed to theoretical claims as is the case for the "natural light" but, as for our animal instincts, not always to be trusted. Descartes argues in fact that man *qua* embodied is naturally led to endorse a few philosophical positions, such as the above-mentioned claim that sensory ideas are similar to their objects or to ascribe "qualities" modelled after the mind to corporeal substances. On the issue see Étienne Gilson, *Études sur le rôle de la pensée médiévale dans la formation du système cartésien* (Paris: Vrin 1930), 168-73.

at such a late stage of the enquiry. Therefore, since the issue at stake is still "open to doubt" we should (and we ought to) hold back our assent from this claim and research more carefully into the matter.

A crucial warning is in order: despite the fact Descartes' argued that the truth of the proposition "material objects exist" does not force itself upon the subject the way it happens to be the case for "cogito, ergo sum" (and, accordingly, cannot be said to be grasped *lumine naturali* by simply perceiving it), in Descartes' views also the existence of material objects can and must be established *philosophically* and thus, ultimately, always "thanks to the natural light" as opposed to the *lumen fidei* (or *lumen gratiæ*), that is, to a "certain inner light which comes from God", by which Christians would be *supernaturaliter illustrati* as far as faith dogmas are concerned.[14] From designating the inner core of the cognitive power, the notion of a "natural light" could in fact be broaden as to encompass the full set of man's natural cognitive capacities, inasmuch as these could have some insight into things only by virtue of being functions of one and the same *vis cognoscens* (this *vis*, in turn, being cognizing only in virtue of the "natural light" that enlighten it in the first place, as it were). This light, according to Descartes, is indeed "no more altered by the objects it applies to than sunlight is by the variety of things it shines on", all cognitive faculties being *cognitive* faculties and all sciences being instances of *scientia* – by keeping in mind the etymology of the term: from *scio*, "to know" – by reason of one and the same "natural light of reason" (*naturali rationis lumine*).[15] A *natural*, *rational* light, *native* to all minds as such, not a purported illumination of a light "supernaturally" bestowed upon an elite thereof. Descartes would accordingly have regarded Regius' claim that we can be certain that a world exists only because the *Book of Genesis* informs us that this is the case – an argument that Malebranche will soon make his own – as an outright philosophical bankrupt.[16] Descartes insisted in fact throughout all his writings that "the search for truth by means of the natural light" – philosophy – must indeed remain "pure" and, consistently, he has never illegitimately and surreptitiously appealed to religious dogmas and fideistic considerations in order to foster his philosophical

[14] Cf. To Hyperaspistes, August 1641; AT III 426. *Responsiones* II; AT VII 147, 27 - 148, 13; CSM II 105.

[15] *Regulæ* I; AT X 360, 10 - 361, 19; CSM I 9-10*.

[16] For Regius' claim that only Revelation can provide an apodictic certainty that the external world exists, see Henricus Regius, *Philosophia naturalis* (Amsterdam: Elsevier 1654), 351; *Philosophia naturalis* (Amsterdam: Elsevier 1661), 416. The thesis is not however to be found in the 1646 *Fundamenta physices* (the only version of the treatise known to Descartes, who died in 1650), as pointed out by Delphine Bellis, "Empiricism Without Metaphysics: Regius' Cartesian Natural Philosophy" in Mihnea Dobre – Tammy Nyden eds. *Cartesian Empiricism* (Dordrecht: Springer 2013), 160. For Malebranche, see *Recherche de la vérité*, *Éclaircissement* VI in Geneviève Rodis-Lewis ed., *Œuvres* (Paris: Gallimard 1979), I 838-41.

commitments: *La Recherche de la Vérité par la lumière naturelle, qui toute pure, & sans emprunter le secours de la Religion*… – so reads the title of Descartes' dialogue. If most Early Modern thinkers could have conceived of science and scientific methods – or at least argued in their favour – as tools for ameliorating the cognitive damage wrought by human sin: Descartes (as pointed out by Harrison) has indeed never expressed concerns of this sort.[17] Accordingly, whereas Malebranche's own *Recherche de la vérité* constantly complained the loss of the "Adamitic state", Descartes showed a positive and sanguine confidence in man's "natural light" or, as he also called it, the "natural power of our native intelligence" (*naturales ingenii nostri vires*), chasing away even the slightest suspect that man's cognitive power could be somehow "corrupted" via a direct appeal to the most perfect being.[18]

It was indeed by pure reason, Descartes claimed, that the existence of the world had to be established. More specifically, once excluded that the subject is himself the cause of his adventitious ideas, Descartes maintained that it was still possible to re-establish the existence of the external world, even though only via a quite circuitous argument:

> So the only alternative is that [the active faculty that produces adventitious ideas] is in another substance distinct from me – a substance which contains either formally or eminently all the reality which exists objectively in the ideas produced by this faculty... This substance is either a body (i.e. a corporeal nature), in which is formally contained everything that is objectively in the ideas; or else it is God (or some other creature nobler than body), which contains it eminently. But since God is not a deceiver, it is altogether evident that he sends these ideas to me neither directly by himself nor indirectly, via some creature which contains the objective reality of the ideas not formally but only eminently. *For God has given me no faculty at all for recognizing any such source for these ideas; on the contrary, he has given me a great propensity to believe that they are issued by corporeal things*. So I do not see how God could be understood to be anything but a deceiver if the ideas were issued from any source other than corporeal things. It follows, therefore, that corporeal things exist.[19]

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[17] Cf. Peter Harrison, *The Fall of Man and the Foundations of Science* (Cambridge - New York: Cambridge University Press 2007).

[18] That Descartes intended the notion of a "natural light" and of *ingenium* as synonyms is clear from *Principia* I 28 (AT VIII-1 16, 6-8), which refers the reader to *Principia* I 25 (AT VIII-1 14, 19-25), from which has been taken the passage just quoted. At *Principles* I 25 Descartes expresses his willingness to give up the natural light in case this would contradict "what God himself has revealed", but the passage does not entail by itself that for Descartes the natural light is somehow "corrupted" (and Descartes, indeed, believed he had never stumbled upon like a contradiction between the two "lights"), but was intended to prevent the theological objections that had already been discharged against Descartes on this exact issue.

[19] *Meditationes* VI; AT VII 79, 14 - 80, 4; CSM II 55* (emphasis added).

From the fact the cognizer does not have the intellectual resources to establish whether the adventitious ideas are brought about by a non-corporeal cause (might it be God, or some other *res cogitans* whose powers surpasses men's) but, on the other hand, happens to have a "great propensity to believe" the cause of these ideas to be bodies, Descartes concludes that the cognizer has indeed all reasons to maintain that corporeal substances exist, *inasmuch as he does not have any argument in favor of the opposite thesis*. Although the cognizer, because of his limited cognitive set-up, is in fact said to be unable to positively establish simply on the face of it which of the two options is the case, for Descartes his "strong" *presumption* in favor of the latter claim settles the matter with absolute or, in Descartes' parlance, with "metaphysical" certainty. Contrary to what is sometimes assumed, Descartes intended in fact all the conclusions of his *Metaphysical Meditations* to share one and the same certainty (the metaphysical one, on course, which in contrast to moral certainty cannot obtain in degrees), for the same reason for which all of Euclid's theorems are equally cogent, from the simplest up to the most sophisticated.[20] The *cogito* argument must of course have already been established in order to prove that material object exist, just as one must already have demonstrated that the sum of alternate angles is equal to two right angles if he is to prove that there are only five regular polyhedra. Once the *Meditations* and the *Elements* arguments are in place, though, the latter claim is intended to be as unquestionable as the former and, indeed Descartes declined merely "probable" arguments in favor of bodies' existence, asking for absolute certainty.[21]

Descartes, it must be insisted, never thought that a "propensity" like the one under question was *by itself* as a sufficient reason to establish the claim that bodies exist, but only that the cognizer had no other reasons but this "propensity" to decide for one of the two horns of the dilemma, and no reason to call into question this conclusion. The cognizer, Descartes argued, could not therefore but conclude that bodies exist since this was the only reasonable conclusion: the only conclusion, namely, he could bring reasons for. In case bodies did *not* actually exist, it would not therefore prove to the wrong only the subject's *magna propensio ad credendum* in the existence of material substances (by itself an inclination among the many, not worth much consideration), but a considered inference that the cognizer, at the end of the *Meditations* reasoning, had taken to be established with "metaphysical" certainty. Such an error, as a

[20] Malebranche, in the same *Éclaircissement* VI quoted above, after mentioning Descartes' proof, argued that "l'existence de la matière n'est point encore parfaitement démontrée, je l'entends en rigueur géométrique"; cf. *Œuvres* I 837 (although Malebranche could well be simply implying that Descartes' proof was indeed intended by its author as a "geometrical" one, but failed its target, as the rest of the *Éclaircissement* seems to suggest).

[21] *Meditationes* VI; AT VII 73, 21-28; CSM II 51* (see §6).

consequence, could not be set aside as an episodic lapse on the subject's part, but would cast doubts on the reliability of the cognizer's rational capacity as such and, accordingly, on the validity of the system of his inferences and believes as a whole. As Descartes admonished, "it is prudent never to trust completely those who have deceived us even once".[22]

According to Descartes there are of course crucial difference between the proof that I who am thinking exist and the argument that led to the existence of the outer world. "Ego cogito, ergo sum, sive existo" is indeed said to be *directly* "revealed to me by the natural light" or (following a phrasing that Descartes plainly took as equivalent) to be *directly* established by my "clear and distinct" perception that this is indeed the case.[23] The existence of material substances has on the other hand been established by Descartes only *indirectly* from the absence of reasons to refute "the great propensity to believe" that this is the case. At the bottom level, though, Descartes' line of reasoning is the same in both cases: the crucial point of both arguments is indeed that the subject lacks the mental skills (*nulla plane facultas*, *nulla alia facultas*) to possibly find out that, in point of fact, he himself and material objects do *not* exist.[24] According to Descartes both the thinking I and material objects *must* therefore exist, since otherwise there would be no way to escape the conclusion that man's cognitive apparatus is intrinsically flawed (a possibility that Descartes thinks to have ruled out by appealing to the benevolence and trustworthiness of God in "constituting" – i.e. creating – man's nature).[25]

The point is made especially clear by considering a different "propensity" of the subject discussed by Descartes in the *Meditations*, namely, the already-mentioned "spontaneous impulse" to ascribe to bodies colors and all like properties: "Nature taught me to think this", so claims the meditator. The proof just expounded has in fact only established that material objects *qua geometrical objects* exist (on the reasons of this restriction of the argument to the geometrical

[22] *Meditationes* I; AT VII 18, 17-18; CSM II 12.

[23] The two phrasings are advanced at a few pages of distance, both in the *Third Meditation*; see the already-quoted *Meditationes* III; AT VII 38, 23 - 39, 5; CSM II 26-27. AT VII 35, 6-15; CSM II 24. The canonical formulation "ego cogito, ergo sum, sive existo" is to be read in *Responsiones* II; AT VII 140, 20-21.

[24] Compare "This is because there cannot be another faculty I can equally trust as this natural light, and which could teach me that what is revealed to me by this natural light is not true" (*Meditationes* VI; AT VII 79, 27 - 80, 4; CSM II 55*) with "For God has given me no faculty at all for recognizing any such source for these ideas; on the contrary, he has given me a great propensity to believe that they are issued by corporeal thing" (*Meditationes* III; AT VII 38, 30- 39, 1; CSM II 27*).

[25] Cf. *Meditationes* VI; AT VII 88, 7-8. *Ibid.* AT VII 77, 14-18; CSM 53: "The second reason for doubt was that since I did not know the author of my being – or at least was pretending not to – I saw nothing to rule out the possibility that my natural constitution made me prone to error (*ita constitutus sum ut fallerer*) even in matters which seemed to me most true".

properties of bodies, see above §6). Immediately, though, the meditator wonders: "what of the other aspects of corporeal things which are… less clearly understood, such as light or sound?". As pointed out by Friedman, even in this case, in keeping with the argumentative strategy illustrated above, Descartes argues that only an exhaustive investigation into the mind's faculties can establish whether one should commit himself to the claim that material substances are not only extended and shaped, but also colored:

> Despite the high degree of doubt and uncertainty involved here, the very fact that God is not a deceiver, and the consequent impossibility of there being any falsity in my opinions which cannot be corrected by some other faculty supplied by God (*nisi aliqua etiam sit in me facultas a Deo tributa ad illam emendandam*), offers me a sure hope that I can attain the truth even in these matters.[26]

This alleged "teaching of nature" will eventually turn out to be the result of what Descartes defines an erroneous "subversion of the natural order" and of the cognizer's gross misunderstanding of the nature of sense-perceptions and of the extent to which ideas of this sort can be taken to provide reliable information on the properties of corporeal substances.[27] In this case, Descartes claims, we do indeed happen to have a faculty – no less than the understanding, actually – which urges us to resist the conclusion that bodies are colored (an argument to be spelled out in the next chapters).

Descartes' nonchalance in putting forward as "the only rule of his truths" both "clear and distinct perceptions" and "the naturale light", together with his admission not all the pieces of truth that he maintained to have established in the *Meditations* have been "clearly and distinctly" perceived (nor have they been "revealed by the natural light"), prove that Descartes' principle "whatever is clearly and distinctly perceived is true" runs quite deeper than the letter of this statement. At the bottom level according to Descartes the doctrinal body of philosophy was not in fact to be established through clarity and distinctness, but by means of a systematic enquiry into the faculties of the mind: their scope, their range of validity, and their mutual relations.[28] It

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[26] *Meditationes* VI; AT VII 80, 14-19; CSM II 55-56. Cf. Michael Friedman, "Descartes on the Real Existence of Matter", *Topoi* 16/2 (1997), 156-58. Of the same author see also "Descartes and Galileo: Copernicanism and the Metaphysical Foundations of Physics" in Janet Broughton – John Carriero eds., *A Companion to Descartes* (Malden: Blackwell 2008), 69-83.

[27] *Ibid.* AT VII 83, 14-15; CSM II 57*: "sed video me in his aliisque permultis ordinem naturæ pervertere esse assuetum". Descartes' views on the range of validity of sensory ideas are discussed in the conclusion to this work.

[28] Accordingly, despite criticizing the concept of a faculty defended in his *De veritate*, Descartes remarks that Herbert of Cherbury was perfectly right in insisting that, in order to establish the truth of a claim, one should "always consider what faculty he is using"; To Mersenne, 16 October 1639; AT II 598; K 140*.

is indeed precisely thanks to such an enquiry into the faculties of the mind that Descartes maintains to have proven both the existence of the thinking substance (expressly qualified by Descartes as the *prima cognitio*) and the existence of corporeal substances (to be achieved only in the last *Meditation*), despite the fact at first glance these demonstrations could not appear more diverse.

The philosopher of "clear and distinct perceptions" was not indeed asking for something like a direct intellectual intuition of essences (of the sort advocated by Husserl), but was searching for the *reasons* to trust the intuitions and the faculties we happen to have. Were "clear", "distinct" and the related antonyms taken to be nothing but possible ways an idea – one single idea, taken by itself – is given to the cognizer, Descartes would indeed have disregarded these phenomenal features as philosophically irrelevant. Contrary to Hamelin's portrait, Descartes' intention was not in fact to present his reader with some exquisite "atomes d'évidence" he had collected one after the other, but to work out the system wherein these dispersed "atoms" would have revealed what they really mean and would have been eventually composed into a "chain" as is the case for the "series of numbers", the logical systematic connection between its items being the true mark of proper science.[29] For Descartes left to itself intuition is indeed worth nothing, only reason is.

What led Descartes to accept an idea or a theoretical proposition as valid is not in fact simply the way they would "manifest themselves" to the mind, but the position they occupy in the total *space of reasons*. The term is not of course to be taken in Sellars' and Brandom's strict sense: their theories of propositions and inferences and the refusal of atomistic semantic are indeed almost completely alien to Descartes. The crucial point, still, is to become as clear as possible that the traditional understanding of Descartes' philosophy in terms of intuitionism

[29] Octave Hamelin, *Le Système de Descartes* (Paris: Alcan & Guillaumin 1911), 85; quoted with approval by Roger Ariew – Marjorie Grene, "Ideas, In and Before Descartes", *Journal of the History of Ideas* 56 (1995), 104. Such a quest for "atoms of evidence" would be more appropriate to characterize Descartes' strategy in the *Rules*; cf. Jean-Luc Marion, *Sur l'ontologie grise de Descartes* (Paris: Vrin 1993²), 134-36. In the *Rules*, indeed, the problem of a "validation" via God of the cognitive faculty has not yet emerged and, accordingly, it is quite likely that the Descartes of the *Rules* would have sided with his fellow Paris scientist (rather than with the theory he was to defend some twelve years later in the *Meditations*) as far as the issue of a "science of the atheist" is concerned. Descartes' demand for a *system* of knowledge – as opposed to a mere collection of intuitions – dates nonetheless back to his juvenile writings, and is indeed already clearly expressed in the early *Rules*; cf. Ernst Cassirer, "Descartes et l'idée de l'unité de la science", *Revue de Synthèse* XIV (1937): 7-28. See *Cogitationes Privatæ* (1619-1621); AT X 215, 1-4: "Larvatæ nunc scientiæ sunt: quæ, larvis sublatis, pulcherrimæ apparerent. Catenam scientiarum pervidenti, non difficilius videbitur, eas animo retinere, quam seriem numerorum".

deeply misconstrues Descartes' fundamental approach to philosophical questions and philosophical arguments. As the analysis set forth in the previous and current chapters should have shown, according to Descartes even the apparently most natural claim (such as my own existence, of the existence of an external world) can indeed be accepted only after having investigated all the arguments in its favor, and rejected all alleged counterarguments. The doubts raised in the *First Meditation* and the considered replies of the *Meditations* that follow aim precisely to work out like a dialectic. If Descartes ended up accepting as valid and trustworthy the "natural light" and the "clear and distinct" perception this faculty casts its light upon, this was indeed only because he thought to have demonstrated that "there cannot be another faculty I can equally trust as this natural light, and which could teach me that what is revealed to me by this natural light is not true".[30] Reason, in this case, has proven intuition to be the best reason we might have and, accordingly, urges us to follow it. In this case too, though, Descartes insisted that rigorous knowledge (*scientia*) always demands way more than the clear and distinct perception of a piece of knowledge taken by itself, so that he could argue against Paris scientists that a clear and distinct comprehension of mathematical propositions cannot be qualified as *scientia* unless grounded on metaphysics and, more specifically, on the existence of a non-deceiving God, so that an alleged "science of an atheist" would be a contradiction in terms (objecting that the possibility of a deceiving God who has studiously endowed us with a faulty cognitive system provides a forceful reason to reject all of our intuitions as unreliable).[31]

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[30] *Meditationes* III; AT VII 38, 23 - 39, 1; CSM II 26-27* (emphasis added).

[31] Cf. *Responsiones* II; AT VII 141, 3-13; CSM II 101*: "The fact that an atheist can 'clearly know (*clare cognoscere*) that the three angles of a triangle are equal to two right *angles*' is something I do not dispute. But I maintain that this knowledge (*cognitio*) of his is not true knowledge (*scientia*), since no act of awareness that can be rendered doubtful seems fit to be called true knowledge (*scientia*). Now since we are supposing that this individual is an atheist, he cannot be certain that he is not being deceived on matters which seem to him to be very evident (*evidentissima*), as I have fully explained. And although this doubt may not occur to him, it can still crop up if someone else raises the point or if he looks into the matter himself. So that he will never be free of this doubt until he acknowledges that God exists"; see also *Responsiones* V; AT VII 428, 1-9; CSM II 289 (which replies to *Objectiones* V; AT VII 414, 24 - 415,8). Cf. To Regius, 24 May 1640; AT III 65: "Quæ duo ita distinguo, ut *persuasio* sit, cum superest aliqua ratio quæ nos possit ad dubitandum impellere; *scientia* vero sit persuasio a ratione tam forti, ut nulla unquam fortiore concuti possit; qualem nullam habent qui Deum ignorant". The original passage from *Objectiones* II (AT VII 125, 6-15) reads, properly speaking, "Atheum clare *&* *distincte* cognoscere" but the next chapters will show that in the *Meditations* Descartes uses clear and distinct almost as synonyms, so that he was not making a conceptual point is dropping distinction out of his reply. See also *Responsiones* VI; AT VII 428, 1-9; CSM II 289*: "As for 'the science of the atheist' of which you speak, it is easy to demonstrate that it not immutable and certain…" (and accordingly, not a science at all, given Descartes' epistemology). The importance of these passages to understand Descartes'

In all matters not enlightened by this *lumen*, the role and the demands of reason become even more evident. Although the claim that external bodies exist and the claim that external bodies are colored present in fact themselves with the same "urgency" to the mind, Descartes argues that there are sound reasons to question the latter and no reasons not to accept the former, which is therefore to be accept as true (and not only as "probably", but as certainly so). Reason, in this case, establishes that a "propensity to believe", albeit "great", is to be accepted only if it goes unchallenged: even in this case (even more in this case) the truth of a proposition cannot therefore be established by taking nothing but this single item into account, but only by inquiring into its relationship with the entire bodies of knowledge and the overall system of the faculty.

Descartes' conviction that the truth of one item of knowledge can be established only by considering the whole system to which this item belongs has actually already been shown to be at work in Descartes' solution to the to the problem of distinguishing between sense-perceptions occurred while awake and dreams. In this case, the gist of Descartes' argument is actually (if possible) even more evident. Descartes argues in fact that taken by themselves a perception and a dream cannot be told apart, as it might well happen that a nightmare is as "vivid" as "distinct" as a sense-perception, when not even "more noticeable and perceptible".[32] In this case too Descartes thought that the solution was to move from a piecemeal consideration of the single items by themselves and one after the other to a systematic study of how they relate. Only the ideas which can be arranged in an orderly succession, Descartes concludes, should therefore count as true instances of perception, whereas all unrelated ideas should be disregarded as delusive figments of the imagination. The order of Nature and of experience, and thus *a fortiori* a philosophical theory, is not indeed for Descartes something that can be assembled by putting together one idea after the other, but requires a *system* – a system wherein to articulate reasons.

The reading defended here should not however be confused with Frankfurt's, who famously claimed that Descartes defended a *coherence* theory of truth – *viz.* a conception of truth

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theory of clear and distinct perceptions had already been emphasized by Peter Markie, "Clear and Distinct Perception and Metaphysical Certainty", *Mind* 88 (1979): 97-104. On Descartes' conception of science, see Willis Doney, "Descartes' Conception of Perfect Knowledge", *Journal of the History of Philosophy* 8 (1970): 387-403. Tom Sorell, "*Scientia* and the Sciences in Descartes" in Tom Sorell – G.A.J. Rogers – Jill Kraye eds., Scientia *in Early Modern Philosophy: Seventeenth-Century Thinkers on Demonstrative Knowledge from First Principles* (Dordrecht: Springer 2010), 71-82.

[32] See the passages discussed in §8.

based on the consistency of the subject's system of believes.[33] Descartes did indeed explicitly define truth in terms of *correspondence*, that is, as "the conformity of thought with its object".[34] My point is rather that for Descartes which ideas has to be accepted as true cannot be established by simply considering an idea *by itself* (that is, by simply relying on the idea's being apprehended in a clear and distinct or in an obscure and confused way), but must take into account the entire system of *reasons* that speak for and against the acceptance of the idea at stake as true.[35] Accordingly, Descartes' correspondence theory of truth should not be taken to be grounded (as is standardly the case) on the intuition of some discrete items of thought one after the other but on the articulation of a logical space wherein these intuitions (as well as different sorts of psychological fact, such as the "great propensity to believe" that bodies exist and that they do have a color) can be adequately justified or appropriately refuted.[36]

Descartes' problematic statements about whether the ideas of certain class are perceived in a clear and distinct or in an obscure and confused way (to be analyzed in what follows) should not therefore be taken as indications of an irreparable inconsistency in his philosophy. Even the absence of a rigorous criterion to tell apart clear and distinct perceptions from obscure and confused ones (repeatedly lamented by Leibniz) proves less detrimental to Descartes' philosophy than it might seem at first glance. Descartes himself has indeed pointed out that "there is some difficulty in noting well what are the things that we conceive distinctly" right after stating his rule of truth, and repeatedly invited his reader to judge carefully and with "prudence" in these matters, apparently appealing to a virtue in the attempt to remedy for his inability to work out a proper criterion.[37] Gassendi, accordingly, caustically accused the hero of

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[33] Harry G. Frankfurt, *Demons, Dreamers, and Madmen*.

[34] From the already-quoted To Mersenne, 16 October 1639; AT II 597; K 139.

[35] The importance of this demand of systematicity in Descartes' theory of knowledge had already been pointed out by John Cottingham ed., *Conversation with Burman* (Oxford: Clarendon Press 1976), xxxi-xxxii and stressed again by Nicholas Jolley, "*Scientia* and Self-Knowledge in Descartes" in Tom Sorell – G.A.J. Rogers – Jill Kraye eds., Scientia *in Early Modern Philosophy*, 83-97, especially 86-89. In the same paper, Jolley convincingly argues against the intuitionistic-minded reading of Descartes' concept of science defended by Lawrence Nolan – John Whipple, "Self-Knowledge in Descartes and Malebranche", *Journal of the History of Philosophy* 43 (2005): 55-82, see in particular 61-63.

[36] Frankfurt himself realized that his reading is quite untenable and tried to rescue at least some of it in his later "Descartes on the Consistency of Reason" in Michael Hooker ed., *Descartes: Critical and Interpretative Essays* (Baltimore - London: John Hopkins University Press 1978), 26-39, but this improved interpretation too is still far from convincing, as rightly pointed out among the others by Sergio Landucci, *La mente in Cartesio* (Milano: FrancoAngeli 2002), 30-37.

[37] See, respectively, *Discourse* IV; AT VI 33, 22-24; CSM I 127*. *Responsiones* VII; AT VII 462, 1-4; CSM II 310*:

the *Discours de la méthode* of having ultimately failed to figure out the method of his own philosophy.[38] Descartes (who provisionally shared Gassendi's thinking that the validation problem of the rule of truth could be regarded as a matter of subordinate importance), resisted Gassendi's accusations with these words:

> What you add then, that one should not take pains over the truth of the rule but, rather, over the Method determining whether we are wrong, or not, when we think we perceive something in a clear way, I do not deny it. But I protest that I carefully provided such a method in the appropriate places, where I first dispelled all preconceived opinions and, subsequently, enumerated all prime ideas, and distinguished clear ideas from the obscure or the confused ones (*enumeravi omnes præcipuas ideas, ac distinxi claras ab obscuris aut confusis*).[39]

The conclusive remark, which puts obscure ideas almost on a par with the confused ones as if distinction had never been in question, reinforces the doubts about Descartes' slipshod use of the terms, which gets in fact more and more serious as Descartes was supposed to try here his best in order to counter any criticism along these lines. The passage, still, reveals that Descartes was confident that in the *Meditations* he really succeeded in devising a method to single out the "primary ideas": this method does indeed coincide with the *Meditations* themselves or, more precisely, with the order of their reasons. As the next chapters aim at showing, Descartes' speaking of "clear", "distinct", "obscure" and "confused" ideas of material substances can (and is indeed to) be restated in terms of "sensory", "imaginative", and "intellectual" ideas of bodies: Descartes, indeed, only made use of the former notions as some sort of shorthands for a

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"only prudent people (*soli prudentes*) distinguish between what is perceived in a clear and distinct way and what only seems to be perceived in this way".

[38] Cf. *Objectiones* V; AT VII 279, 12-17 & 318, 3-11; CSM II 194-95 & 221.

[39] *Responsiones* V; AT VII 361, 23 - 362, 4; CSM II 250*. Mersenne's Circle had already raised an objection along Gassendi's line. While Descartes rejected Gassendi's objection by simply restating the soundness of his method, by insisting that the order of his reasoning was intended to satisfy exactly these requirements, the kindred criticism of the *Objectiones* II urged Descartes to rearrange *more geometrico* his proves of the existence of God and of the real distinction between the mind and the body; cf. *Responsiones* II; AT VII 160-70; CSM II 113-20. For the criticism, see *Objectiones* II; AT VII 126; CSM II 90. Descartes himself, nonetheless, dismissed such a reconstruction (solicited by the mathematicians gathering around Mersenne) as improper, since it made one misread the actual *ordre des raisons* of his line of reasoning. Descartes, accordingly, refuted to spell out a "geometrical method" to tell apart the "prime ideas" from the others, and suggested his readers to rather pay attention to what he had been actually doing in the course of the work; cf. *Ibid.* AT VII 164, 8-11: "hoc enim facilius exemplis quàm regulis addiscitur, & puto me ibi omnia hujus rei exempla vel explicuisse, vel saltem utcumque attigisse".

complex line of reasoning entirely based on the latter. As this section intends to prove, it is indeed to the system faculties of the mind, rather than to any talk about "clear" and "distinct" perceptions, that the interpreters must refer if they are to make sense of the inner logic of the *Meditations*.

§10. Clear *vs.* obscure perceptions

As Descartes expressly points out in the *Rules*, the concept of a clear and distinct perception comes from the lexicon of visual experience and has been transferred from eye vision to the *acies*, *obtutus*, or *intuitus mentis*, these notions too being nothing but crystallized metaphors of the same sort (as it happens to be the case also for *idea*):

> We can better understand how mental vision is to be employed by comparing it with eye vision. If one tries to look at many objects at one glance, one sees none of them distinctly. Likewise, if one is inclined to attend to many things at the same time in one single act of thought, one does so with a confused mind. Yet craftsmen who engaged in delicate operations, and are used to fixing their eyes on a single point, acquire through practice the ability to make perfect distinctions between things, however minute and delicate. The same is true of those who never let their thinking be distracted by many different objects at the same time, but always devote their whole attention to the simplest and easiest of matters: they become perspicacious.[1]

Analogously for the concept of a clear perception, as Descartes makes as explicit as possible in his most guarded definition of the notion, to be read in the *Principles*:

> I call 'clear' a perception that is present and open to the attentive mind, just as we say that we see something clearly when it is present to the gazing eye and stimulates it strongly and openly enough.[2]

One does not therefore need to turn to the treatises on rhetoric in use at La Flèche (as suggested by Gaukroger) in order to account for the genesis of these concepts, which do clearly

[1] Cf. *Regulæ* IX; AT X 400, 24 - 401, 10; CSM I 33*. The expression *obtutus mentis* (simply rendered as "ma pensée" in the French version; AT IX-1 51) can be read at *Meditationes* V; AT VII 64, 5. An important warning is in order: given the main topic of the work, the chapter does not intend to provide an exhaustive treatment of Descartes' theory of clear and distinct perception, but addresses the issue only insofar as is relevant for Descartes' general theory of bodies. In what follows, accordingly, the only ideas to be discussed extensively – will they be clear or obscure, confused or distinct – will be the ideas of material objects. As a matter of fact, such a restriction is in keeping with Descartes' own approach to the topic: as the next chapter shows, Descartes' most elaborated treatment of distinct perceiving (to be read in the *Principles*) singles out in fact precisely the perception of material objects as its main – not to say exclusive – object.

[2] *Principia* I 45; AT VIII-1 22, 3-6; CSM I 207*: "Claram voco illam [perception], quæ menti attendenti præsens & aperta est: sicut ea clare à nobis videri dicimus, quæ, oculo intuenti præsentia, satis fortiter & apertè illum movent". See also *Meditationes* V; AT VII 70, 3-7.

and distinctly stem from vision theory.[3] The same plainly holds true also for the concept of a "natural light" as well as for many of the other terms employed by Descartes to qualify perception: *manifesta* (complicated by the implicit opposition to occult) and the just-mentioned *evidens* and *perspicua*, which qualifies an intuition of a particular object that does not mix it up with the objects nearby, by preserving its singularity – its outline, as it were. Descartes' notion of distinction amounts exactly to such a way of perception and he speaks of it, consistently, as a "precise" intuition (faithful to the etymology of the term) that singles out the object *qua* individual, by separating it from all the others: *ab omnibus aliis sejungendo*.[4] By clarity, on the other hand, Descartes refers to what would nowadays be called psychological or phenomenological evidence (by keeping in mind the origin of the term), a perception being clear if it strikes the mental eye, so to say: in the *Meditations*, indeed, Descartes uses *evidentissime* as a straightforward synonym for "very clear".[5] It must indeed be pointed out that it is only at a quite later stage (approximately from the *Meditations* onwards) that Descartes singled out "clear", "distinct" and their respective antonyms as the terms of arts of his theory of perception. For a long while he was in fact used to refer to the same features with quite a few alternative labels, as it has just been pointed out: "evident", "manifest" and so forth for the former (as well as *vividæ & expressæ*); "perspicuous", "precise", and the like for the latter. "Clear" and "distinct" should therefore be treated, especially in Descartes' early writings, as nothing but standard placeholders for two quite broad semantic areas, bond by the origin from vision theory of most of their terms. It was only at a later stage of Descartes' philosophy that the expression "clear and distinct" – as well as the rival "obscure and confused" – became a term of art, and became adopted as such by Descartes' first followers and, subsequently, by his interpreters. It cannot be established whether it had been the translator of the 1637 *Discourse* into Latin or Descartes himself, but where the French simply spoke of *idées confuses* the 1644 *Specimina philosophiæ* could not resist to add one more

[3] Stephen Gaukroger, "Descartes's Early Doctrine of Clear and Distinct Ideas", *Journal of the History of Ideas* 53/4 (1992): 585-602, where he argues that "the ultimate source" of this piece of Descartes' philosophy "lies in the rhetorical-psychological theories of Quintilian". The *philosophical* textbook studied by Descartes in La Flèche already made use of these notions, which appears to have been originally imported in epistemology from vision theory during the 13th Century; cf. Étienne Gilson, *Index scolastico-cartésien* (Paris: Vrin 1979[2]), 84-86.

[4] Cf. *Regulæ* IX; AT X 400, 13-15 (title): "Oportet ingenij aciem ad res minimas & maximè faciles totam convertere, atque in illis diutiùs immorari, donec assuescamus veritatem distinctè & perspicuè intueri"; 21-22: "perspicacitatem... res singulas distinctè intuendo"; *Regulæ* III; AT X 369, 25-26: "cogitationis motum singula perspicuè intuentis" (followed by a visual example); *Regulæ* VII; AT X 389, 21-25.

[5] Cf. *Meditationes* V; AT VII 70, 3-7.

adjective.[6] The *ideæ obscuræ & confusæ* (together with their more praise-worthy companions) had become what they still are today: what anyone expects to read in a work written by Descartes.

The practitioners in optics of Descartes' time were indeed making use of the same terms to name the same features, even though in relation to the experience of a shiny color or of a blurred contour rather than to "ideas" in general. In his *Saggiatore* (1623), by way of example, Galileo instructed how to adjust the telescope in order to obtain a well-defined and luminous image, so to see the object "distinto e chiaro".[7] Already the only extant report of the first time a telescope was presented to a public audience (to the court of Maurice of Nassau, more precisely, in whose army Descartes will enlist ten years later) spoke of "certaines lunettes, moyennant lesquelles on peut decouvrir & voir *distinctement* les choses esloignées", and the capacity of the telescope to show in a distinct way what, at a naked eye, did not appear but "con figura piccolissima et a fatto indistinta" was praised all over Europe with the selfsame words.[8] Descartes himself, in his writings on optics, was specifically concerned with the suitability of the crystalline lens and the other refractive components of the eye for the formation of a well-focused image with bright colors on the retina, whose shortcomings, he claimed, would have been emended by the telescopes with hyperbolic lenses of his invention, thanks to which the

[6] See respectively AT VI 38, 29 and 562. On the authorship of the translation, see Corinna Vermeulen's introduction to her edition of the *Specimina philosophiæ* (Ph.D. thesis, Utrecht University 2007), 8-14.

[7] Galileo Galilei, *Il Saggiatore* in *Opere*, ed. Franz Brunetti (Utet: Torino 1964), 675: "Ma bene è vero, che avvicinandolo a piccolissime distanze, come di quattro passi, di due, d'uno, d'un mezo, la specie dell'oggetto più e più sempre s'intorbida ed offusca, sì che, per vederlo *distinto e chiaro*, convien più e più allungar il telescopio, al qual allungamento ne conséguita poi il maggior e maggior rincrescimento: ed avvenga che tal rincrescimento dependa solo dall'allungamento, e non dall'avvicinamento, da quello, e non da questo, si deve regolare; e perché nelle lontananze oltre a mezo miglio non fa di mestieri, per veder gli oggetti *chiari e distinti*, di muover punto lo strumento, mutazione cade ne' loro ingrandimenti ma tutti si fanno colla medesima proporzione" (emphasis added). Clear is very likely to be contrasted here with murky, distinct with out of focus, even though Galileo's scant remarks are perhaps not enough to make too much of it.

[8] The first quotation is from the *Ambassades du Roy de Siam envoyé à l'excellence du Prince Maurice, arrivé à la Haye le 10. Septemb. 1608*, p. 9 (edited without name and editing place in 1608, most probably in October 1608 at The Hague, though). The latter is from a letter of Giudo Bentivoglio to Scipione Borghese, dated Bruxelles, April 2nd, 1609; it can be read in Engel Sluiter, "The Telescope before Galileo", *Journal for the History of Astronomy* XXVIII (1997): 231-32, and again in Massimo Bucciantini – Michele Camerota – Franco Giudice, *Il telescopio di Galileo: Una storia europea* (Torino: Einaudi 2012), 16. "Distinct" can be found in many texts quoted in this volume, which proves beyond any doubt the widespread diffusion of these terms; see pp. 31, 62, 91, 127, 145, 187, 219, 236, 253; for "clear" see pp. 13 and 28.

objects' colors would have no longer been "obscured" – i.e. dimmed – and their outlines no longer "confused" – i.e. blurred.[9]

Descartes, actually, was not the first one to import into philosophy the concept of a clear and distinct perception, these terms having been widely adopted since the late Middle Ages – when they were first transferred from vision theory to epistemology – and could still be read in the treatises he studied in La Flèche.[10] What is peculiar Descartes', though, is that he did not consider the transposition of these concepts from visual experience to phenomenology, passing through optics, as a mere metaphorical shift. One of the main tasks of Descartes' physiology was indeed precisely to account for the transmission of these strong and well-defined patterns of collisions of light rays on the retina from the eye to the surface of the pineal gland, in order to form a clear and distinct *corporeal* idea (the topic is at the center of §24).[11] Accordingly to Descartes, the differences in clarity and distinction between ideas in the most proper sense – *viz.* as mental items – result in fact from differences in clarity and distinction between their causes on the physiological level – *viz.* between the so-called "corporeal ideas".[12] Descartes, actually, went so far as to *infer* the latter (inaccessible to the instruments of the time) from the former, mental states being in principle open to consciousness and, accordingly, ready to be

[9] Cf. *Homme*; AT XI 154-63 and, more in particular, 163, 2-3: "leurs couleurs sont un peu obscures, & leurs lineaments un peu confus"; analogously *Dioptrique* VI; AT VI 147, 10-11. Descartes, who thinks of these contours as the boundaries between areas of different colors, speaks, accordingly, "de la vision distincte de ces couleurs" and hints at the optical relation between clarity and distinction; see *Dioptrique* 6, AT VI 133, 18 - 134, 20; 145, 28 - 147, 4. From the physical point of view luminance, according to Descartes, depends on the strength by which a second-element particle strikes an object (here, the rear of the eye), while color corresponds to the ratio between the rectilinear velocity of the particle and its spin (more on the issue in §26). For Descartes' concepts of clarity and distinction in optics see the entire *Fifth* and *Sixth Discourses* of the *Dioptrique*; see, for example, AT VI 127, 7-11: "Et que ce trou peut estre beaucoup plus grand, lors qu'on y met un verre, que lors qu'on le laisse tout vuide, sans que les images en soyent pour cela de beaucoup moins distinctes. Et que, plus il est grand, plus elles paroissent claires & illuminées".

[10] On the concept of clear and of distinct perception in Scotus see Emanuela Scribano, *Angeli e beati: Modelli di conoscenza da Tommaso a Spinoza* (Roma - Bari: Laterza 2006), 89-90. The notions, Stoic in origin, were still widespread at the time Descartes was writing, as also attested by Goclenius' *Lexicon philosophicum* (Frankfurt: Becker 1613); cf. Roger Ariew – Marjorie Grene, "Ideas, In and Before Descartes".

[11] Cf. *Homme*, AT XI 155, 11-14; 184, 12-15: "la figure de quelque object particulier est imprimée beaucoup plus distinctement qu'aucune autre, à l'endroit de cerveau vers lequel est iustement panchée cette glande"; 185, 18-19: "ce qui rend l'idée que forment ces esprits d'autant plus parfaite".

[12] Blatantly enough, this only holds true for ideas of material objects. The difference in clarity and distinction of purely intellectual ideas cannot of course be accounted by appealing to differences in the corresponding brain impressions since according to Descartes intellectual ideas do depend on *no* material impressions at all.

examined through introspection. He also discussed in detail how the overall brain conditions could affect the clarity and distinction of an idea, in the attempt to explain how the same sense-impression could give rise to very different reactions (both on the physiological and on the phenomenological level) and, more in particular, why the corporeal and thereby the mental ideas formed during sleep can result to be "more distinct and more lively" than those that are formed during waking.[13]

Leaving aside the optical metaphors they stem from, as well as their physiological counterparts, the concepts of a clear and distinct perception demand to be investigated in their own right. In order to elucidate these concepts, it is standard procedure among interpreters (following Gewirth) to take as a starting point the only definitions of clarity and distinction offered by Descartes, to then try their best to square the usage of the early works with the late theorizing of the *Principles*.[14] Frustratingly enough, the vocabulary of the *Meditations* is fairly unsystematic, not to say staggering, since in many occasions Descartes seems to intend there "clear" and "distinct", together with a great variety of other kindred adjectives, almost as synonyms, rather than as two fundamental features of perception to be painstakingly told apart. Descartes' liberality in terminology and his enjoyable stylistic variety go nevertheless at the expense of argumentative rigor, and the "rule of truth" itself does not find any unambiguous formulation within the *Meditations*. Nor in the *Principles*, actually. The formulation by which this rule is most widely known – "whatever is clearly and distinctly perceived is true" – albeit standard, is in fact far from being the only one. It was precisely to regulate such a flexible jargon that, in the *Principles*, Descartes finally came up with a definition of both clarity and distinction.

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[13] See the passages from the *Traité de l'Homme* (AT XI 198, 14-25; Hall 109) already discussed in §8: "if stung by a fly when we sleep, we dream that someone has stubbed us with a sword; or if we are not adequately covered, we imagine ourselves quite naked; or if we are covered with a little too much, we think ourselves weighted down by a mountain". La Forge will develop this thesis in his *Remarques* on the first French edition of Descartes' *Traité de l'homme* (1664), where he argues that phenomenological *clarity* derives from physiological *distinction* and, analogously, the obscurity of an idea from confusion of its material cause; cf. Louis de La Forge, *Remarques… sur le Traité de René Descartes* (Paris: Le Gras 1664), 309: "l'experience toutesfois nous apprend que la clarté de nos perceptions dépend de la distinction de ces [bodily] mouvemens; et que celuy qui les a joints ensemble, a voulu qu'elles fussent obscures quand ces mouvemens sont confus, et qu'elles fussent claires, quand ils sont bien distinguez entr'eux".

[14] Cf. Alan Gewirth, "Clearness and Distinctness in Descartes", *Philosophy* 18 (1943): 17-36. Gewirth's brilliant *tour-de-force* in Descartes' overall theory of ideas contains plentiful of insightful remarks, but ends up advancing a quite too speculative reading of Descartes' theory of "clear and distinct" perception (distinguishing as it is between a psychological, a perceptual and a logical understanding of these notions), which overlooks furthermore Descartes' changes of mind – and of terminology – on the topic in order to come up with a systematic account as neat as possible.

According to the above-mentioned definition of clarity, a perception is to be called "clear" in case it strikes the eye "strongly and openly enough": "I call 'clear' a perception that is present and open to the attentive mind". To be clear, for an idea, means thus to be evident to our mental eye as we direct our attention to it. Such a definition is however far from being satisfactory, as Descartes nowhere explains what a *præsens & aperta* perception should look like, nor are these terms less problematic than the one they were supposed to define. Notions of this sort, as already objected by Hobbes, are nonetheless "metaphors, not arguments" (*metaphorica est, nec igitur argumentativa*) – a criticism to which Descartes replied by appealing to one more, slightly different metaphor.[15] It is crucial to realize that, even in the *Principles*, Descartes did not mean to provide a sound logical definition of clarity, despite the fact he was mimicking one in order to answer the objections of his first readers and comply with the requirements of a Scholastic textbook (this being the intended purpose of the *Principles*). As a matter of fact, throughout his writings Descartes kept on scorning definitions as hocus-pocus (*verba magica*) appropriate only for quibbling Schoolmen and expressly theorized that no grounding concepts ought to be defined. It is indeed precisely in virtue of being self-evident, he argued, that some concepts are to be singled out as the cornerstones of a philosophical system.[16] Therefore, according to Descartes there are no other concepts that could help us to better understand them, since any pretension to define *clarum per obscurius* cannot but result in a misunderstanding. Nor is there any need of, actually, as long as these concepts are clear, as Descartes was convinced it was the case (just to name an example) for the notion of truth:

> He [Herbert of Cherbury] examines what truth is; for my part, I have never had any doubts about truth, because it seems a notion so transcendentally clear that nobody can be ignorant of it. There are many ways of examining a balance before using it, but there is no way to learn what truth is, if one does not know it by nature. What reason would we have for accepting anything which could teach us the nature of truth if we did not know that it was true, that is, if we did not know truth? Of course, it is possible to explain the meaning of the word to someone who does not know the language, and tell him that the word 'truth', in the strict sense, denotes the conformity of thought with its object… But no logical definition can be given which will help anyone to discover its nature. I think the same of many other things which are very simple and are known naturally, such as shape, size, motion, place, time, and so on: if you try to define these things you only obscure them and get muddled (*on les obscurcist & on*

[15] *Objectiones* III; AT VII 191, 25-26. *Responsiones* III; AT VII 192, 19-20.

[16] See already *Regulæ* XII, AT X 425, 20 - 427, 2.

s'embarrasse). For instance, a man who walks across a room shows much better what motion is than a man who says 'It is the actuality of a potential being in so far as is potential', and so on.[17]

Even in the *Principles*, just after having presented the first of the non-many definitions of the treatise, Descartes made this telling disclaimer:

> *Matters that are very simple and self-evident are only rendered more obscure by logical definitions, and should not be counted as items of knowledge which it takes effort to acquire.*
> I shall not explain many of the other terms which I have already used or will use in what follows, because they seem to be sufficiently self-evident. I have often noticed that philosophers make the mistake of employing logical definition in an attempt to explain what was already very simple and self-evident, the result being that they only make matters more obscure.[18]

According to Descartes the "tree of Porphyry" commended by Schoolmen, which started by defining man as an *animal rationale*, to then define in turn *animal* as *vivens sensitivum*, and *vivens* as *corpus animatum*, and *corpus* as *substantia corporea* (and likewise for *rationale*) was not in fact the cornerstone of learning but just "a maze, from which we would be never to escape, once entered", a rigmarole or, at best, "a science of nothing but words, which does not illuminate anything and leaves us in the state of ignorance from which we had started".[19] Therefore, and in keeping with his entire epistemology, in order to explain what a clear perception consists in Descartes could only ask his reader to examine his own consciousness: "whether perceptions are clear or not, we do know it from introspection (*ex propria conscientia*)".[20] Descartes' alleged "definition" of clarity in the *Principles* is thus at best to be regarded as an *elucidation* of the use of the term, not being intended to provide any working criterion to tell apart clear perceptions

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[17] Cf. To Mersenne, 16 October 1639; AT II 597; K 139*. "Trascendentalement claire" is a *hapax* in Descartes' *corpus*; cf. *Lettere* 1061.

[18] *Principia* I 10, AT VIII-1 8, 3-16; CSM I 196*.

[19] *Recherche de la vérité*; AT X 515-16 (my translation). On Descartes' dissatisfaction with the traditional definition of man, see also *Meditationes* II; AT VII 25, 25-31. Surprisingly enough, the passage is not even mentioned in Umberto Eco, *Dall'albero al labirinto: Studi storici sul segno e l'interpretazione* (Milano: Bompiani 2007). In at least one more occasion, in presenting his method, Descartes recommended his reader "to follow this Rule as closely as he would the thread of Theseus if he were to enter the Labyrinth"; *Regulæ* V; AT X 379, 23 - 380, 2; CSM I 20. According to Descartes the *arbor Porphyrii* is indeed to be replaced by the *arbre de la philosophie* – of Descartes' own philosophy, of course – because, he claims, "the whole of philosophy is like a tree, whose roots are metaphysics, the trunk is physics, and the branches emerging from it are all the other sciences, which may be reduced to three principal ones: medicine, mechanics, and morals"; *Principes*, *Preface*; AT IX-2 14, 24-28; CSM I 186*.

[20] *Conversation with Burman*; AT V 160.

from the obscure ones. Descartes, by the same token, refused to work out a definition of "clear" and "distinct" even while rearranging the main theses of the work *more geometrico* in response to the objections coming from Mersenne's Circle, despite the fact he had criticized expressly on that point.[21] Descartes replied by asking his readers "to ponder on all the examples that I went through in my *Meditations,* both of clear and distinct perception, and of obscure and confused perception, and thereby accustom themselves to distinguishing what is clearly known from what is obscure. For this is something that it is easier to learn by examples than by rules", thereby refuting to provide not only a logical definition of the perceptual features under question, but even a general working criterion to tell them apart.[22]

Descartes' characterization of a clear perception and his way of speaking of this notion in both the *Mediations* and the *Principles* suggests at any rate sufficiently enough that in his views an idea (actually, *any* idea) can pass from obscurity to clarity by becoming more and more evident, till it comes to hold the mental eye. Descartes, unfortunately, has never spoken his mind on whether such a degree transition from obscurity to clarity is in fact continuous or not. It should be noticed, though, that Descartes maintained that in a collision the moved body acquires its speed in an instant, without passing through infinite degrees of speed. Consequently, the acceleration of a body put in motion by another body is not continuous and, so, Descartes rejected the view, defended by Galileo, according to which a falling body would pass (at least ordinarily) through "infinite degrees of slowness".[23] Even though one should be very cautious in illegitimately transposing Descartes' argument from physics to phenomenology, Descartes' theory of collision shows that he endorsed no general law of continuity. Therefore, in the absence of any explicit reference to a continuous progression from obscurity to clarity, it is only legitimate to speak of a passage from the former to the latter, and vice versa, without qualifying it any further (there is of course another sense in which perceptions can be said to be continuous, since the mind, according to Descartes, is uninterruptedly thinking: such a continuity over time of the stream of thought does not entail any actual continuity of perception's "degrees", though). Actually, rather than proving that Descartes maintained the

[21] Cf. *Objectiones* II; AT VII 128, 14-18.

[22] *Responsiones* II; AT VII 164, 5-11; CSM II 116*.

[23] Cf. To Mersenne, 11 October 1638; AT II 399: "Ce que dit Galilée, que les Corps qui descendent passent par tous les degrés de vitesse, je ne croy point qu'il arrive ainsi ordinairement, mais bien qu'il n'est pas impossible qu'il arrive quelquesfois"; see Carla Rita Palmerino, "Infinite Degrees of Speed: Marin Mersenne and the Debate over Galileo's Law of Free Fall", *Early Science and Medicine* 4/4 (1999): 269-328. Descartes, actually, did not rule out the possibility of a constant acceleration, but argued that only a not-physical cause (i.e. a mind, might it be God's or a finite one) could act *æquali vi* on a body.

transition between different degrees of perception to be discrete, his silence on the matter seems to reveal that he had never worried much about a problem he bequeathed to the philosophers of later generations (a point especially emphasized by Cassirer).[24]

The difference between clarity and obscurity would accordingly turn out to be a mere difference in degree, whereas one might have expected a difference in kind between the two, so long as a major part of Descartes' philosophy seems to be grounded precisely on this opposition. Descartes seems indeed to have drawn his celebrated distinction between two classes of ideas of a material body – extension and its modes (shape, motion and so forth) on the one hand; colors and all other proper sensibles on the others – by appealing to nothing but these perceptual features, claiming that the ideas belonging to the former class are perceived in a clear and distinct manner, whereas this would not be the case for the latter. Descartes, as a matter of fact, contrasted these two classes of ideas precisely in these terms.[25] At the same time, though, in the very same works in which he stated the oppositions between two classes of ideas of bodies, Descartes also claimed that not only shapes, but also colors can be apprehended in a clear manner and that "when someone feels an intense pain, the perception he has of it is indeed very clear" (pain counting for Descartes as a tactile sense-perception).[26] Descartes, actually, seems to be also committed to the much bolder view that a color-perception can happen to be even more clear than a shape-perception, would the former capture the most the subject's attention. By way of example, the idea of a sharp stabbing pain, is undeniably much clearer to the perceiver than the idea of the triangular edge of the sword it is provoked by.[27] While

[24] The issue, as well-known, received particular attention by the so-called Leibniz-Wolffian school and gave rise, with Baumgarten, to aesthetics as a modern discipline. Cassirer celebrated the formulation of a law of continuity as one of Leibniz' chief achievements and as a decisive advance compared to Descartes; see Ernst Cassirer, *Leibniz' System in seinen wissenschaftlichen Grundlagen* (Marburg: Elwert 1902), II 4. Leibniz will indeed prove Descartes' laws of motion to involve a discontinuity, which (according to Leibniz) suffices to prove them wrong.

[25] *Meditationes* III; AT VII 43, 10-23; CSM II 29*.

[26] *Principia* I 46; AT VIII-1 22, 10-17; CSM I 208. For pain as a sensible proper to touch see especially *Principia* IV 191, AT VIII-1 318, 5-24. Cf. *Meditationes* II; AT VII 30, 11-13; CSM II 20*: "the color, shape and magnitude of the wax are clear (*manifesta*)". As shown in a few pages, Descartes maintained that the perception of colors and like ideas can be not only clear, but even clear and distinct; see below the analysis of *Meditationes* VI (AT VII 83, 16-23) and *Principia* I 68 (AT VIII-1 33, 8-12).

[27] Descartes discusses the case of a soldier (perhaps he himself) convinced that he has been wounded by an enemy sword but that, once back, finds that he is not bleeding at all and nothing but a dent in his armor; cf. *Monde* 1; AT XI 6, 6-17; CSM I 82. Although Descartes' example was originally meant to argue for a distinction between the sensation in itself and the judgment about its cause, it does not seem illegitimate to gather from there that the

watching at the sun, analogously, the dazzling brightness of its light can result more "evident" – i.e. "vivid" – than its round shape, dimly perceived. One is confronted here with the most serious limit of Descartes' refusal to define his concept of clarity: incapable as is of parting itself in a rigorous way from its opposite, it should indeed come as no surprise that clarity is unable by itself to account for the differences in perceiving color and shape.

Descartes, indeed, usually paired the concept of clarity with the related notion of a "distinct perception". Accordingly, even though both colors-ideas and shape-ideas can happen to be clear, Descartes would still have the resources to tell them apart, by contrasting the ideas of a material body that are *clear but confused* with the class of *clear and distinct* perceptions. The concept of a distinct perception would thus come to be the bedrock of Descartes' epistemology of bodies. Such a reading, which has been advocated by many important scholars (by Vinci, for example), runs nonetheless against Descartes' own statements, especially with a few all-important claims he made in his later works.[28] As the following chapter shows, Descartes maintained in fact that *any* idea of a body, once taken the appropriate precautions, can in fact be both clear and distinct.

(sensation of) pain caused by the armor is much more present to the soldier's mind that the proper shape of its dent.

[28] Thomas C. Vinci, *Cartesian Truth* (New York - Oxford: Oxford University Press 1998), 198-207.

§11. Distinct *vs.* confused perceptions

Based on which criteria did then Descartes intend to distinguish between a confused and a distinct perception? Before addressing this question, an important caveat is in order: contrary to what happens with clarity, the *Principles* understanding of distinction as the outright clarity of an idea perfectly singled out from any other (an idea being distinct only in case "it does not contain in itself anything, except for what is clear") is only a late result of Descartes' epistemology.[1] Although it is not impossible to acknowledge the seeds of this conception already in the *Rules*, in that earlier work "distinct" took on many other meanings, sometimes at risk of falling into a plain contradiction.[2] In the *Meditations* too the concept of distinction remains quite problematic, first of all because in this work too Descartes did not care to supply with a definition thereof. Descartes would likely have resisted any objection along these lines by reiterating what he had argued when his notion of clarity was put into question, insisting that no primitive concept (neither clarity, nor distinction) can be defined, and that his opponents ought to come to terms with that. Descartes' notion of distinction seems nevertheless to be much more structured than the notion of clarity, and too elaborated to be legitimately taken as primitive.

Although there are not enough clues to flesh out the exact meaning of Descartes' concept of distinction in the *Meditations*, it is nonetheless plain at least that Descartes meant there, by distinction, a property of an idea deeper than its mere being clear and, accordingly, a requirement harder to meet. Such an understanding of the concept appears on the surface in a few side remarks of the work, although Descartes never addressed explicitly the issue.[3] In all the crucial passages of his tortuous line of reasoning about the essence of material bodies, Descartes did in fact always appeal to nothing but *distinct* perception (neither to "clear", nor to "clear and distinct" perception), thereby suggesting that, were the latter criterion be fulfilled, so would have been clarity.[4] Accordingly, one would feel legitimated to recast Descartes' rule of

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[1] *Principia* I 45; AT VIII-1 22, 6-9; CSM I 207-208 (the definition is analyzed in a few pages).

[2] See for example *Regulæ* XII; AT X 421, 11-17.

[3] Cf. *Meditationes* VI; AT VII 75, 14-18: "cùmque ideæ sensu perceptæ essent multo magis vividæ & expressæ, & suo etiam modo magis distinctæ, quàm ullæ ex iis quas ipse prudens & sciens meditando effingebam, vel memoriæ meæ impressas advertebam".

[4] See in particular the passages already discussed in §6, from *Meditationes* V; AT VII 63, 11-16: "Et quidem priusquam inquiram, an aliquæ tales res extra me existant, considerare debeo illarum ideas, quatenus sunt in meâ cogitatione, & videre quænam ex iis sint *distinctæ*, quænam *confusæ*. Nempe *distincte imaginor* quantitatem...". See also *Meditationes* VI; AT VII 74, 1-4; *Meditationes* VI; AT VII 73, 25-26.

truth by dispensing completely with clarity. As a matter of fact, though, by going attentively through Descartes' texts as to verify this hypothesis, one comes to find out with no little surprise that the reverse claim proves to be true. Descartes was in fact perfectly happy to maintain that "whatever is clearly perceived is true", without even mentioning distinction, whereas the supposed alternative phrasing is nowhere to be found in the text (even though at one point Descartes states the rule in terms of *perspicue* perceiving).[5] In the *Principles* too, actually, despite having defined distinction as a sort of thoroughgoing clarity and expressly stated that the former is a far more demanding requirement than the latter, Descartes felt free to restate his "rule of truth" by referring to nothing but clarity.[6]

In the 1644 treatise, though, Descartes finally resolved to work out a definition of distinct perception which, differently from what happened to be the case with clarity, is to be conceived as a proper logical one. Descartes explains thus that, by "distinct", he refers to

> a perception which, as well as being clear, it is so disjointed and so sharply cut off from all other perceptions (*ab omnibus aliis ita sejuncta... & præcisa*), that it does not contain within itself anything, except for what is clear.[7]

The definition runs quite smoothly and was formulated in terms as general as possible to cover all possible cases of confusions which, according to Descartes, result from mixing up – from confounding together, in the literal sense of the term – two or more perceptions (i.e. two or more ideas). The passage from confused to distinct ideas is indeed according to Descartes non-continuous, i.e. discrete.

As a matter of fact, Descartes' intended target in writing down this definition was nonetheless a highly peculiar sort of confusion, which arises from a failure at disentangling a sense-perception from the judgment that what the sense-perception represents is precisely *such as* the sense-perception presents it to be. Or, in Descartes' own terms, that "the pain as it exists

[5] Cf. *Meditationes* V; AT VII 70, 22-23: "jam scio me in iis quæ perspicue intelligo falli non posse". The formulation of the rule of truth mentioning only clarity can be read a few pages before (65, 2-9). At the best of my knowledge, in the *Rules* Descartes' alleged standard formulation of his rule of truth surfaces only once; cf. *Regulæ* XI; AT X 407, 15-18: "ad mentis intuitum duo requirimus: nempe ut propositio clarè & distinctè, deinde etiam ut tota simul & non successivè intelligatur".

[6] Cf. *Principia* I 43; AT VIII-1 21, 10-19.

[7] *Principia* I 45; AT VIII-1 22, 6-9; CSM I 207-208*: "Distinctam autem illam [perceptionem], quæ, cùm clara sit, ab omnibus aliis ita sejuncta est & præcisa, ut nihil planè aliud, quàm quod clarum est, in se contineat".

in their limbs" of "the color as it exists in external objects" is "*similar* to the perceiver's sensation of pain" (or, correspondingly, of color):

> As long as someone feels an excruciating pain, his perception of this pain is very clear, although not always distinct. For people commonly confuse their *perception* of pain with an *obscure judgment about the nature of this pain*, and they take the pain as it exists in their limbs to be *similar* to their sensation of pain, which is yet the only thing they perceive clearly. Consequently, a perception can be clear without being distinct, whereas a distinct perception cannot but being clear.[8]

Besides having a more *ad hoc* target than it might first appear, Descartes' definition of distinction as the successful discrimination between two perceptions does not go without difficulties. Sensations are in fact only one of Descartes' four classes of ideas in the proper sense of the term: besides sense-perception Descartes' concept of perception covers in fact also pure intellections, imaginings, and recollections – *viz.* the ideas of the pure understanding, of the imagination, and of memory. On the other hand, the judgment that a sensory idea presents its object precisely as is (like *any* judgment) can be called a perception only in a derivative sense: as already pointed out in §1, Descartes' most proper concept of idea ascribes in fact perceptions to the passive faculty of the mind – the intellect in the broad sense of the term – whereas judgments are said by Descartes to be the products (or, better, the actions) of the mind *qua* active – *viz.* of the willing faculty. A sensation and a judgment, therefore, cannot be put together as if they were perceptions of the same sort. What matters most, though, is not that a sensation and the corresponding judgment belong to different faculties of the mind, but the fact that the two are far from being on a par. As pointed out in §0, according to Descartes, judgments are in fact characterized by a *complex noetic structure*, which adds a distinctive feature to the basic intentional character of ideas. For Descartes the *logical form* of the judgment arranges in fact the perceptual content into a structure that goes beyond the mere *apprehension* of such a content (the idea in the proper sense of the term):

> Some of my thoughts are as if it were images of things, and they are indeed the only ones for which the term "idea" is entirely appropriate... But other thoughts have some other additional forms (*quasdam præterea formas*): when I will, for example, or I am afraid, when I affirm or deny, I am always apprehending

[8] *Principia* I 46; AT VIII-1 22, 10-17; CSM I 208*: "Dum quis magnum aliquem sentit dolorem, clarissima quidem in eo est ista *perceptio* doloris, sed non semper est distincta; vulgò enim homines illam confundunt cum *obscuro suo judicio de naturâ ejus*, quod putant esse in parte dolente *simile* sensui doloris, quem solo clarè percipiunt. Atque ita potest esse clare perceptio, quæ non sit distincta; non autem ulla distincta, nisi sit clara" (emphases added).

> a particular thing as the subject matter of my thought, but in my thought I grasp something beyond (*aliquid etiam amplius quàm*) that particular idea. These are called "volitions", "emotions" and "judgments".[9]

The confusion between the idea of a material body and the judgment about what the idea represents (by which a subject is seeking to figure out what the pain and the colors, the shapes and motion he perceives really are) cannot therefore be taken as an instance among the many of a lack of distinction between perceptions, but is to be understood as a *categorical confusion*. A confusion, namely, not between perceptions on equal footing, but between a perception and a superordinate judgment which does belong, properly speaking, to a different category of mental items. Descartes, to be sure, could speak of a judgment as a perception without flying in the face of his theory because he was not thinking here (not at first instance, at least) of an actual act of judgment, but of the *memory* of many past judgments about the same matter. And, as a matter of fact, such a memory is indeed a perception – an idea – in the most proper sense of the term. It is precisely because of this that Descartes labeled it an *obscurum judicium* of the mind, an action repeated so many times to have lost its initial spontaneity and have been turned into a habit. The cognizer, Descartes thinks, is still no less accountable for such a judgment than he is for his moral habits, both (both theoretical and practical habits) being in fact nothing but the consequences of his free choices. The judgment, accordingly, is not to be named an "obscure" one because of the content it is about, but only because the subject himself is in the dark about its true nature of a judgment. The confusion tackled by Descartes in the *Principles*, therefore, can be dispelled only once the judgment and the related sense-perception are told apart and, in addition, the judgment is properly acknowledged as such, by recognizing the original act of the will behind the remembrance of it. Descartes writes, indeed, that "people *commonly* (*vulgo*… *homines*) confuse their perception of pain with an obscure judgment about the nature of this pain", thereby obviously implying that the confusion at stake can be avoided. How to achieve this result is indeed the main topic of this section of the *Principles*.

According to Descartes such a categorical confusion between an idea and the judgment that the idea represents its object precisely as is not in fact random, but results from the intentional nature of any idea which, always being an idea *of* something, prompts the perceiver to investigate what this something is. But since according to Descartes the perceiver only perceives by means of ideas, it should not surprise that he could come to believe that bodies are precisely as the adventitious ideas of the senses depicts them to be: "*the most obvious judgment* for me to make is

[9] *Meditationes* III; AT VII 37, 3-12; CSM II 25-26*.

that a body transmits to me its likeness rather than something else", so claims the meditator at the beginning of his enquiry into sense-perceptions.[10] According to Descartes *all* the adventitious ideas of the senses (the ideas of both the proper and the common sensibles) prompt such a judgment. Therefore, the categorial confusion at stake concerns in principle *any* sensory ideas, might they be the ideas of colors or the ideas of shapes. The "distinction" addressed in the *Principles* cannot therefore provide a discriminating criterion between two classes of ideas of material substances. As a matter of fact, it is straightforward to realize that a perceiver could happens to fail to distinguish the mere *mental representation* of an object as shaped and the *judgment* that the object is indeed shaped, while succeeding in keeping distinct the two in the case of a color-idea. Already in the *Meditations* Descartes had indeed made the case that pain, heat and all sense-perceptions, of both the internal and the external senses, despite being typically construed as intrinsically confused ideas, are in fact "clear and distinct enough" as long as the perceiver refrains from judging whether bodies are indeed as these sensory ideas depict them to be. To the extent to which no judgment is passed, for Descartes the ideas of colors and the ideas of shapes are indeed on a par, since they all cannot be but distinct. To the extent to which a judgment is passed, the confusion brought in by the implicit (*obscurum*) judgment concerns on the other hand both classes of ideas, indiscriminately.

If Descartes was careful in distinguishing between sense-perceptions and judgments, in both the *Meditations* and the *Principles* he was however less careful to tell apart the *categorical confusion* just described from the *error* it *can* give rise to (only "can", not "does"; more on this below). Indeed, while the perception-judgment confusion concerns in principle *any* sensory idea, Descartes aims at arguing that it might, and it does indeed lead to an actual error only in the case of a particular class of ideas is concerned: the class of the ideas of proper sensibles. That is to say, as already explained in §6, of those features of bodies of which according to Descartes we do not also have innate intellectual notions (as is the case for shape), but are only apprehended thought the senses. This shift from the categorical perception-judgment confusion to the error it might arise therefrom explains why Descartes always denounced the lack of distinction of the ideas of the proper sensibles, despite the fact the perceiver is equally prone to such a confusion in the case of the ideas of features such as shape (and all remaining common sensibles of the Aristotelian tradition):

[10] *Ibid.* AT VII 38, 20-22; CSM II 26*: "Nihilque magis obvium est, quàm ut judicem istam rem suam similitudinem potius quàm aliud quid in me immettere".

> In order to distinguish what is clear… from what is obscure, we must be very careful to note that pain and color and so on are clearly and distinctly perceived when they are regarded merely as sensations, or thoughts. But when they are judged to be real things outside our mind, there is no way of understanding what sort of things they are. If someone says he sees color in a body or feels pain in a limb, this amount to say that he sees or feels something there whose nature is completely unknown to him (*quod quidnam sit planè ignorat*). Or, in other words, that he does not know what he is seeing or feeling. Admittedly, if he fails to pay sufficient attention, he might easily convince himself that he has some knowledge of what he sees or feels, because he may suppose that there is something *similar* to the sensation of color or pain which he experiences within himself. But if he examines the nature (*quidnam sit*) of what is represented by the sensation of color or pain – what is represented as existing in the colored object or the painful part – he will realize that he is wholly ignorant of it (*omnino advertere se id ignorare*).[11]

Descartes, it is crucial to notice, is not here arguing that the *intentionality* of sensory ideas results from a judgment, but is only claiming that the judgment that sensory ideas present their objects precisely *as there are* is unwarranted (as already pointed out in §0, according to Descartes sensory ideas are indeed *intrinsically* representational: they represent, as it were, "by their own forces"). The naïve meditator takes this judgment to be "obvious": "Nature has *apparently* taught me" that adventitious ideas are *similar* to the objects from which they come, he claims. But, he immediately asks himself, "what is my *reason* for thinking so?"[12] This alleged "natural teaching" is introduced by Descartes together with the "great propensity to believe that bodies exist". But as already pointed out in §9, the proof that such an inclination to assert that external object exist is to be followed and trusted does not apply to this other case. According to Descartes, since adventitious ideas can be demonstrated to represent bodies, and given the differences between my adventitious ideas, it is indeed to be concluded that bodies present at least *corresponding* differences (by leaving aside for the time being the case of perceptual errors): "from the fact that I sense very different colors, sounds, smells, flavors, hot, hardness and the like, I am correct in inferring that in the bodies which are the source of these various sense-perceptions there are some corresponding, though perhaps non-similar, differences (*iis respondentes, etiamsi forte iis non similes*)".[13] "Perhaps". But are they, or are they not? Aristotelians thought they were in fact similar. Descartes, on his part, contested that there is "no convincing *argument* for supposing that there is something in the fire similar (*aliquid simile*) to the heat". The second part of this work is intended to show that for Descartes there were on the other hand

[11] *Principia* I 68; AT VIII-1 33, 8-25; CSM I 217* (emphasis added).

[12] *Meditationes* III; AT VII 38, 14-16; CSM II 26* (emphases added).

[13] *Ibid.* AT VII 81, 17-22; CSM II 56*.

quite a few arguments that suggest the opposite conclusion. According to Descartes, the only legitimate conclusion to be drawn on the basis of the theory of ideas and the metaphysics he had built thereupon was indeed that "that there is *something* in the fire, whatever it may eventually turn out to be (*aliquid, quodcunque demum sit*), which produces in us the feelings of heat".[14] If according to Descartes the existence of external objects can be firmly demonstrated by 'first philosophy', whether bodies are colored *as we perceive them to be* was to be established on a completely different basis (by 'natural philosophy', namely).

According to Descartes the judgment that colors *as they exist in bodies* are similar to the *ideas* the perceiver has of these physical features is not in fact to be counted among the "teachings of Nature", but only results from a precipitate and illegitimate trust in what was later to be called "common sense". Descartes, accordingly, qualifies this sort of judgments as "improvident", "thoughtless", "ill-considered" (which is of course not to be confused with their being *false*; for Descartes they are, indeed, but this is another issue):

> There are many other things which I may appear to have been taught by nature, but which in reality I acquired not from nature but for a habit of making ill-considered judgments. Cases in point are…. my belief that the heat in a body is something exactly resembling the idea of heat which is in me. Or that, when a body is white or green, the selfsame whiteness or greenness which I perceive thought my senses is present in the body. Or that in a body which is bitter or sweet there is the selfsame taste which I experience.[15]

If it is only in the *Principles* that Descartes defines confusion in terms of a categorical confusion between ideas and judgments, it is to be pointed out that already in his previous works Descartes' chief reason to demote purely sensory ideas to the class of "obscure and confused perceptions" was not that the representation of the object provided by sense-perceptions is necessarily *partial* and/or *coarse-grained*. Descartes' main point is *not* that sensory ideas – contrary to what happens to be the case with intellectual notions – can only apprehend *some* aspects of the object they are about, but always fail to distinguish or even simply leave out many other features of their object.

Descartes admitted that this is in fact the case with quite a few sensory ideas, if no other because of the physiological limits of our sensory system, which has a certain threshold of

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[14] *Meditationes* VI; AT 83, 6-12; CSM II 57.

[15] *Ibid.* AT VII 82, 1-10; CSM II 56-57: "Multa verò alia sunt quæ, etsi videar a naturâ doctus esse, non tamen revera ab ipsâ, sed a consuetudine quadam inconsiderate judicandi accepi, atque ideo falsa esse facile contingit: ut quod… in corpore, exempli gratiâ, calido aliquid sit plane simile ideæ caloris quæ in me est, in albo aut viridi sit eadem albedo aut viriditas quam sentio, in amaro aut dulci idem sapor, et sic de cæteris".

receptivity and only a limited discriminatory power between different stimuli. Still, Descartes was also explicit that such a sub-optimal form of representation can also be found in *intellectual* ideas, and cannot therefore be taken as peculiar to the class of sensory ideas alone. One of Descartes' declared goals in the *Meditations* was indeed precisely to disentangle and single out the fundamental features of innate intellectual notions such as the one of the mind and of the body, which at the beginning of research stand to their objects in a relation analogous to the one depicted above. It has in fact already been insisted that for Descartes ideas are not intended to provide a *Wesenschau*, by revealing the essence of the object they are about at one single glance. According to Descartes, even as far as innate intellectual ideas are concerned, figuring out the true nature of the object they represent is indeed a complex cognitive process, of which the *Sixth Meditations* offer a few essays. A process that according to Descartes can never be taken to have been brought to conclusion: as pointed out in §3, Descartes insisted in fact that even as far as numbers are concerned (whose ideas are among the clearest we have) one cannot be sure to have already discovered the entire set of their fundamental properties. As a matter of fact, there is for Descartes at least one instance in which it can be rigorously established that the human mind will never be able to capture the entire essence of the idea's object: the case of the supremely infinite being, namely, of which according to Descartes no finite mind would ever be able to attain an exhaustive knowledge. Partial and/or coarse-grained representationality cannot therefore be regarded as the distinctive and definitory trait of purely sensory ideas.

In relegating sense-perceptions to the class of "obscure and confused" ideas, Descartes was in fact first of all considering a different problem of the relation of representation, which he regarded to be not only *specific* to sensory ideas, but also *intrinsic* to this class. As shown in the previous chapters, for Descartes the "concept of the nature of bodies" is one of the innate ideas of the understanding, from which Descartes concluded that bodies are indeed extended, since in the light of the best cognitive resources at our disposal (ultimately, the understanding) we cannot think of them otherwise. In calling sensory ideas "obscure and confused" Descartes wanted to point out that, contrary to the notions inborn to the understanding, the adventitious ideas of the senses cannot be taken to provide any transparent insight into the nature of the objects they are about. Descartes does indeed expressly (and repeatedly) affirm that "the sensations of hunger, thirst, pain and so on are nothing but confused modes of thinking, which arise from the union and, as it were, intermingling of the mind with the body".[16] By the same token, Descartes argued that "passions are to be numbered among the perceptions that the close

[16] *Ibid.* AT VII 81, 11-14; CSM II 56.

alliance between the soul and the body renders confused and obscure".[17] In these and similar passages, the thesis that the ideas of sensibility are apprehended confusingly is thus presented by Descartes as nothing but the epistemological counterpart of his metaphysical understanding of this faculty and, more generally, of the mind-body union: being sensibility nothing but the *vis cognoscens* qua directed and almost "fused" with the body, Descartes argued that the cognizer, in sensing, cannot but feel confusedly (where sensing is intended to include not only seeing and like sense-modalities but also the experience of passions and of the co-called "natural appetites").[18]

Descartes' main issue with sensory ideas is not that they provide only an incomplete or a not very fine-grained representation of the objects they are about. Even in case a sense-perception would perfectly preserve the inner complexity of the object is represents, according to Descartes it would still be impossible (by considering nothing but this sense-perception) to determine whether it depicts it *eo ipso modo* as it is, or otherwise.

As shown more in detail in §15, Descartes maintains that sense-perceptions are indeed opaque to the point of not being even able to prove themselves wrong – i.e. to the point of making at least certain that objects are not as they portray them to be. Sensory ideas do represent, according to Descartes, and represent actual features of bodies. According to Descartes, nothing more can however be legitimately said about this property of body merely "on the face" of sense-perceptions. Therefore, when Descartes states in both the *Second* and the *Sixth Meditation* (the all-important passages already considered in §0) that sensory ideas cannot be taken to be "reliable touchstones for *immediately* discerning the essence of the bodies located outside us" inasmuch as they "represent this essence only in a very obscure and confused way",[19]

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[17] *Passions* I 28; AT XI 350, 1-3; CSM I 339*. As already pointed out in §8, in the *Treatise of Man*, the *Meditations* and the *Principles* Descartes gathered passions and natural appetites under the label of the "internal senses", whereas in the *Passions of the Soul* he reserved the term to the latter. As already shown, this difference in taxonomy does not affect yet the main line of reasoning. In what follows, accordingly, "internal senses" will stick to Descartes' use of the term in the 1630s and early '40s.

[18] As already explained, Descartes broadened in fact the concept of sense-perception as to encompass not only the five standard *external* senses but two *internal* ones: the natural appetites (such as hunger and thirst) and the passions. As for the latter, he insisted in fact that "passions are received into the soul in the same way as the objects of the external senses, and they are not known by the soul any differently"; *Passions* I 28; AT XI 350, 3-6; CSM I 339*.

[19] *Mediationes* VI; AT VII 83, 16-23; CSM II 57-58*: "sed video me in his aliisque permultis ordinem naturæ pervertere esse assuetum, quia nempe sensuum perceptionibus… utor tanquam regulis certis ad *immediate* dignoscendum quænam sit corporum extra nos positorum essentia, de qua tamen nihil valde obscure & confuse significant" (emphasis added). As already pointed out in §0, "signify" means here the same as "represent". For a more articulated analysis of the passage see the conclusions to this work.

his first thought was not that sense-perceptions fail to capture the essence of a material object by only presenting the perceiver with a fragmentary image thereof. This was admittedly an issue, according to Descartes, and Aristotelians too had always been perfectly aware that perceptual errors might and do in fact occur, and that our senses are limited both in scope and in detail. The crucial "obscurity and confusion" Descartes intended to denounce had however to do with what can be called the *epistemological opaqueness* of this class of representations, which is for Descartes an inescapable shortcoming of all non-intellectual ideas qua non-intellectual ideas.

It is however only once Descartes' entire physics is in place that purely sensory ideas will be discovered to represent their objects *as other than they are* (setting forth and arguing for this reading is the main goal of the second part of this work). Only at that very late stage of his enquiry Descartes will consider himself entailed to claim that, in the case of color and the like, the "natural" categorical confusion between sensory ideas and judgments leads to an error and that, consequently, the ideas of proper sensibles are to be regarded as "materially false". It is therefore only with the wisdom of hindsight that color-ideas can be characterized in these terms at the outset of the argument, while still in the domain of pure phenomenology. As a matter of fact, Descartes' statements in the *Third Meditation* are more tentative than most of his interpreters have taken them to be (as I show in the already-mentioned §15). On the other hand, since Descartes regarded as established that bodies are extended things, he concluded that the perceiver does not make any mistake in judging that the ideas of the common sensibles (of which we have not only sensory, but also intellectual and hence distinct imaginative ideas) represent bodies as they are. That these ideas are "true". It would almost be tempting to say: "*materially* true".

Obviously enough, Descartes acknowledges the existence of perceptual errors also as far as features such as shape are concerned, but he also points out that one should be careful to distinguish between "particular" and "general" errors.[20] A perceiver could indeed happen to think of a far-off tower or of the sun as having a shape and a size quite different from the ones they possess. The tower, still, has *a* shape, as the sun certainly has *some* dimensions, so that these errors should be demoted to "particular" ones, in principle amenable to rectification. In case

[20] Cf. *Meditationes* VI; AT VII 80, 11-19; CSM II 55-56*: "As far as the other aspects of corporeal things which are either particular (for example that the sun is of such and such a size or shape), or less clearly understood (such as light or sound or pain) are concerned, despite the high degree of doubt and uncertainty involved here, the very fact that God is not a deceiver, and the consequent impossibility of there being any falsity in my opinions which cannot be corrected by some other faculty supplied by God, offers me a sure hope that I can attain the truth even in these matters". See §9 above for a detailed explanation of the final remark concerning the "other faculty supplied by God".

bodies would turn out to have no color of their own (but, say, only certain surface textures with reflect light rays in different ways) *any* ascription of a color to an object would on the other hand be *in principle* mistaken. Descartes, accordingly, conceived of these cases as instances of "general" errors. Once again, for Descartes it remained nonetheless still to be determined at this stage of the enquiry – while still in the domain of 'first philosophy' whether this is or not the case.

Although Descartes moves from the *phenomenological priority* of a particular class of ideas (to cast the question in terms as general as possible) to conclude that they are true, it is in fact crucial to realize that he has never argued that an idea's being perceived in an obscure and confused way (or, to address the issue in terms as general as possible, an idea's being non-primary) entails *by itself* the idea's being false. According to Descartes, to put it concisely, *ab obscuro ad falsum non valet consequentia*. As a matter of fact, Descartes only argued that "whatever is clearly and distinctly perceived is true", so that since (Descartes claims) we do have a clear and distinct understanding – i.e. an innate intellectual notion – of bodies as extended objects, bodies (provided they exist) have to be extended. On the other hand, the subject's being in the dark about the nature of colors and other purely sensory features as a result of their being non-innate only entails for Descartes that the (non-primary) ideas under scrutiny *may* be false, since "I think of these only in a very confused and obscure way, *to the extent that I do not even know whether they are true or false*, that is, whether the ideas I have of them are ideas of real things or of non-things".[21] Descartes did not in fact admit any "rule of falsity" alongside his "rule of truth": Descartes' philosophy appeals to God only as the ultimate warrantor of our science, not as a handy excuser of our ignorance. Therefore, contrary to what happens to be the case with some Cartesians such as La Forge and Malebranche, according to Descartes himself the "obscure and confused" perception of, say, colors does not authorize to positively conclude that *albedo* and *viriditas* are not real properties of bodies. Lacking a "clear and distinct" understanding of colors the matter remains indeed problematic, for better *and* for worse.[22] What is obscurely perceived is not, for Descartes, *eo ipso* false. The problem is rather that the perceiver has so poor an insight into matters of this kind that "if he found any truth in what he grasps so obscurely, it is only

[21] The passage is the follow-up of the text just quoted from *Meditationes* III; AT VII 43, 23-26; CSM II 29* (emphasis added).

[22] The importance of this asymmetry in Descartes' philosophy had been already pointed out by Steven J. Wagner, "Descartes's Arguments for Mind-Body Distinctness", *Philosophy and Phenomenological Research* 43/4 (1983): 499-517. On La Forge's and Malebranche's commitment to this principle (contrary to Descartes), see Lisa Downing, "Sensibles Qualities and Material Bodies in Descartes and Boyle" in Lawrence Nolan ed., *Primary and Secondary Qualities: The Historical and Ongoing Debate* (Oxford: Oxford University Press 2011), 109-35.

by accident", so that he would never have an argument to prove that the piece of truth he stumbled upon is in fact true.[23]

One could maybe be tempted to resist the conclusion by insisting that is precisely the fact the categorical confusion under question leads to an error in the case of color-ideas and all remaining purely sensory features (contrary to what happens to be the case with shape-ideas and like notions) to establish the intended distinction between two classes of ideas of bodies. It is undeniably true that for Descartes there is a key asymmetry between the ideas of proper and of the common sensibles since according to Descartes only the latter are "true" – *viz.* are in bodies "in the very same way (*eo ipso modo*) in which we perceive them to be", so that bodies are *de facto* extended, and figured, and in a certain position in relation to each other, and so forth.[24] The point, though, is how Descartes intended this conclusion to be established. Descartes indeed did not, could not and has in fact never appealed to truth and falsity to tell apart different classes of ideas (as the reading just mentioned would suggest). The argumentative strategy of the *Meditations* proceeds in fact precisely the other way around: from the ideas, namely, to their being true or false. Although (as pointed out in §9) Descartes' line of reasoning runs deeper than the "rule of truth", this rule still perfectly captures and conveys the gist of Descartes' philosophy, which always moves from the mind to the world and, thus, from the ideas to the objects these ideas are about and (subsequently) to the judgments concerning their nature. Accordingly, Descartes' overall strategy to find out the true nature of material bodies could take as its starting point nothing but *phenomenological* criteria – criteria, that is to say, which only pertain to the way an idea is given to the mind, any talk about truth and falsity aside (being truth and falsity defined as the agreement or disagreement of the idea with its object). Two ideas, therefore, cannot be told apart by virtue of their being true or false, since their being true or false can only be inferred from the different ways these ideas present themselves to the cognizer.

These phenomenological criteria are usually taken to be supplied by "clarity and distinction" and their respective antonyms. The passages listed so far have however shown that the question cannot be solved so easily, since Descartes himself claimed in many other occasions – but still in the same works – that the ideas of proper sensibles too can be perceived both clearly and distinctly. Ultimately, a close reading of Descartes' works has indeed reveal that neither clarity

[23] *Responsiones* II; AT VII 164, 12-15; CSM II 116*: "advertentes nullam se unquam in iis quæ clare perceperunt falsitatem deprehendisse, nullamque e contra veritatem in obscure tantum comprehensis nisi casu reperisse".

[24] Cf. *Meditationes*, *Synopsis*; AT VII 13, 10-12: "ea omnia quæ clare & distincte intelligimus, eo ipso modo quo illa intelligimus, esse vera".

nor distinction can account for the distinction between two classes of ideas of a material body, since any idea – both of colors and of shapes – can in principle be both clear and distinct. Already in the *Rules* Descartes thought of distinction as a phenomenological feature richer than clarity, but he has never come to spell out what such a greater richness would ever amount to, nor is he always consistent with his own understanding of the concept, as shown by his wavering over the formulation of the rule of truth. In the *Meditations* Descartes seemed to have realized that clarity alone was unable to offer a valid criterion to single out the primary ideas of a body and he started reworking his concept of a distinct perception accordingly. Still, the ultimate definition of the *Principles*, illuminating as is about some paramount issues of Descartes' theory of ideas, reveals that distinction too is in fact incapable of settling the matter.

The rule of truth and Descartes' philosophical project seem thus to run into a disaster, since clear and distinct perceptions proved of no help in answering the question about the nature of material objects. As shown in detail in the previous sections, Descartes' distinction between two classes of ideas of material objects is however ultimately grounded on the two distinctions between factitious, innate, adventitious and intellectual, imaginative and sensory ideas. The previous sections have also shown that the concepts of "clear" and "distinct" and of "obscure" and "confused" perception are not required to draw these taxonomies, for how much Descartes happened sometimes (mostly for exposition's sake) to couch his argument in terms of "clear and distinct" perceptions and antonyms. The previous sections have indeed never made use of the concept of a "obscure and confused perception" and opposite to articulate the two three-fold taxonomies just-mentioned, thereby proving beyond any doubt that Descartes' theory of bodies can in fact do without what are usually regarded as the building blocks of Descartes' entire philosophy. According to Descartes, philosophy had to be grounded on something even more fundamental than the concepts of clear, distinct, obscure and confused perception: the distinction between the theoretical faculties of the mind, namely, as he made crystal-clear in presenting the rule of truth in his first mature philosophical work:

> The rule that "everything we perceive very clearly and very distinctly is true" is assured only by the reason that God is (i.e. that he exists), and that he is a perfect being, and that everything which is in us comes from him…. Once the knowledge of God and of the soul has made us certain of this rule, it is easy to recognize that the things we imagine in dreams should in no way make us doubt the truth of the thoughts we have when awake… For after all, whatever we are awake or asleep, we ought never to let ourselves be convinced expect by the evidence of our reason. I will observe that I say "our reason", not "our imagination" or "our senses". Indeed, even though *we see the sun very clearly*, we must not judge on that account that it is only as large as we see it. And *we can distinctly imagine* a lion's head on a goat's body

without having to conclude from this that a chimera exists in the world. For reason does not insist that what we see or imagine in this way [i.e. clearly and/or distinctly] is true.[25]

Even though the concept of a clear and distinct perceptions offers an indispensable leading thread to track down Descartes' line of reasoning about bodies in the *Meditationes*, it would therefore be an error to mistake it for the argument itself or, at least, for its ultimate grounding. Descartes' phenomenology had indeed the conceptual resources to account by itself for the celebrated distinction between two classes of ideas of bodies. Not the phenomenology of clear and distinct perceptions, though. Ultimately, Descartes' argument that bodies are extended substances is indeed grounded on his theory of the faculties, according to which all theoretical faculties are to be understood as functional specifications of the "cognitive power", which taken in its purity – as not yet embodied – is to be identified with the understanding, whose "natural light" is according to Descartes what gives the subject an insight into things, what makes of him an "intelligent substance" in the very first place – a *cognizer*.

[25] *Discours* IV; AT VI 38, 15 - 40, 8; CSM I 130-31* (emphases added).

§12. Conclusions: *Distinctum naturæ corporæ conceptum*

Descartes argued for the claim that the essence of bodies consists in extension by making use of a phenomenological argument already in his first extant writings. From at least the late 1620s (in case the received dating of the *Rules* is correct), Descartes started to work out quite a few arguments intended to show that the ideas of material objects are to be grouped into two main classes. These two classes, according to Descartes, are not on a par, but would differ in some crucial features. It was precisely from this alleged phenomenological difference between the class including ideas such as the ideas of shape and the class including the ideas of color, sounds and so forth that Descartes intended in fact to demonstrate that shape is indeed a property of bodies, whereas no similar argument applies in the case of colors.

In the *Rules*, Descartes grounded this distinction between these two classes of ideas of material substances on the received distinction between two classes of *sensibles*, the proper and the common ones, which Descartes further complicated by reworking it in the light of his early doctrine of the "simple" notions. In the *Rules* Descartes argued in fact that "the concept of shape is so simple and common to be implicit in every sensibles" (*involvatur in omni sensibili*).[1] It was precisely on the account of this supposed phenomenological priority of shape over color that he proposed to pattern the differences between perceived colors after the difference between some shapes (like the chessboards and grids famously depicted in this *Twelfth Rule*).

In his later writings, however, Descartes appears no longer to assign any foundational role to the distinction between proper and common sensibles (despite continuing to uphold it) and turns accordingly to other phenomenological criteria in order to draw the intended distinction between two classes of ideas of bodies. These criteria revolve for the most part around the claim that the ideas of extension, shape and motion would be "simpler and easier to know" than anything else in bodies and, more in detail, "clearer and more intelligible"[2] that the ideas of colors and analogous sensory features, which should accordingly be demoted to the class of "obscure and confused" perceptions. What would it mean to be perceived in a "clear and distinct" or in an "obscure and confused" way is however never explained in the 1633 *World*, nor does the 1637 *Discourse* expound on what this alleged major intelligibility of extension over

[1] *Regulæ* XII; AT X 413, 7-8; CSM I 41*. Descartes' argument to pattern perceived color-differences after shape-differences will be analyzed in detail in §§24-25.

[2] *Discourse* V; AT VI 42, 27-31; CSM I 132: "Ainsi, premièrement, je décrivis cette matière, et tâchai de la représenter telle qu'il n'y a rien au monde, ce me semble, de plus clair ni plus intelligible, excepté ce qui a tantôt été dit de Dieu et de l'âme".

all other sensible qualities would precisely consist in.[3]

Descartes himself realized (arguably also because of the criticism to the philosophical section of the *Discourse*) that these claims needed to be substantiated and argued in detail. Providing these arguments is indeed one of the main tasks that Descartes set for himself in the *Meditations*. The *Meditations on first philosophy* were in fact intended by Descartes to present his most considered views on the issue and to defend them at his best. In order to so, Descartes substantially reworked most of his previous claims, and worked out a conceptual apparatus that exceeds by far the meager remarks in phenomenology of all his previous writings. It was in fact only in the *Meditations* (as shown in §1) that Descartes introduced the distinction between factitious, innate and adventitious ideas and articulated in detail his system of the faculties of the mind (spelled out in §5). Some of the key notions of these two pieces of Descartes' philosophy can of course already be found in his writings of the 1620s and '30s, but (just to name an example) in the *Rules* to be qualified as "innate" is only the *faculty* of thinking, not the objects of thought. The notion of adventitious ideas too, which has been introduced by Descartes first of all in order to prove the existence of the external world, was nowhere to be found in the writings before the *Meditations*, not even in the *Discourse* (which offers accordingly no proof in favor of this claim).

The theory of faculties too appears to shift from the late 1620s to the writing of the *Meditations*, even though not so markedly: after the treatise devoted to its "direction", *ingenium* lost for example much of its importance as Descartes happened to be driven by different concerns. By the same token, the shift in focus from providing an epistemology for his newly discovered *mathesis* to the grounding of metaphysics (not to mention Descartes' later project to study the passions *en Physicien*) resulted in a different evaluation of the role of the imagination in man's cognitive life, which the *Meditations* tried to downplay as much as possible in order to clear the ground for pure intellection, this being for Descartes the only way entities such as the I and God can be known.

Figuring out what material substances truly are and, subsequently, whether they exist for real was however according to Descartes an equally pressing issue, since he thought that only

[3] In the *Treatise* Descartes seems to rework the argument of the *Rules*, but this time in relation to the faculty of the imagination, claiming as he is that the idea of extension is somehow "comprised" in everything we can imagine, arguing on this basis for its priority over all other ideas of material objects; cf. *Monde* VI; AT XI 35, 12-14; CSM I 91: "Et pour la matière dont je l'ai composé, il n'y a rien de plus simple, ni de plus facile à connaître dans les créatures inanimées; et son idée est tellement comprise en toutes celles que notre imagination peut former, qu'il faut nécessairement que vous la conceviez, ou que vous n'imaginiez jamais aucune chose".

once established that the essence of bodies consists in extension it could indeed be proven that mind and bodies are "really distinct" – i.e. that they are independent entities: the *res cogitans* and the *res extensa* – and "destroy the principles of Aristotle" in name of a brand new physics.[4] It is therefore not surprising that Descartes put so much emphasis on the demonstration of this claim in the *Synopsis* of the work, where he informed his readers where to look at for the crucial steps of this argument. In order to "establish the distinct concept of corporeal nature", as already shown, Descartes pointed out that no less than three *Meditations* were needed: the *Second*, the *Fifth*, and the *Sixth*.[5]

It is indeed in the *Second Meditation* that Descartes argued that the essence of material substances – like any essences – is to be enquired from the vantage point of the understanding, explaining why in his views the other two theoretical faculties of the mind (imagination and sensibility) fell short of this task. In the *Second Meditations*, as already pointed out, Descartes could however only *assume* for the sake of argument such a distinction between mental faculties. As shown in §§5-8, it is in fact only after having introduced that distinction between factitious, innate and adventitious ideas and having enquired into the phenomenal character of ideas that Descartes thought he could prove that man's "cognitive power" is to be articulated into three main theoretical faculties – or, as Descartes also call them, three "functions" of human cognition. In order to account for the differences between intellectual and imaginative ideas – and, all the more, between imaginings and sense-perceptions – Descartes thought that one had however to prove that bodies exists. Thanks to a close study of the ideas whose representative content and order of occurrence in the timeline of though cannot be freely determined by the subject himself, after having ruled out the possibility of unconscious mental faculties and enquired extensively into the epistemological status of the man's "great propensity to believe" that bodies exist (analyzed in §2 and §9), Descartes' concluded in the *Sixth Meditation* that material object do exist. Among these bodies, Descartes singled out one piece of matter, the so-called "personal" body, to which the mind would be "united" despite remaining able of existing independently of it. It was moreover precisely by enquiring character of imaginative and sensory ideas, so different from what he took intellectual ideas to be, that Descartes argued for such a mind-body union. In order to prove that bodies exist – in order to prove that anything exists, as a matter of fact – for Descartes it was however first of all to be determined what is (*quid sit*) the thing whose existence (*an sit*) is under doubt. Descartes, as pointed out in §0,

[4] To Mersenne, 7 February 1641; AT III 298; K 173*.

[5] *Meditationes*, *Synopsis*; AT VII 13, 13-15: "distinctum naturæ corporeæ conceptum, qui partim in ipsâ secundâ, partim etiam in quintâ & sextâ formatur".

conceived of his theory of ideas precisely in terms of like an enquiry into the constitution of things by virtue of an investigation of the corresponding ideas the perceiver has of them. For Descartes this was in fact the only legitimate method of enquiry once the universal doubt had called into question the existence of everything other than the thinker himself. It was in the *Fifth Meditation* – tellingly entitled "On the essence of material objects" – that Descartes presented his argument that the essence of bodies consists in extension, an argument largely based on the notion of innate ideas. As shown in §3, Descartes presented some quite articulated arguments in order to show that there are indeed ideas whose occurrence in the timeline of thought can be freely determined by the subject but whose representative content cannot, to conclude in the light of these features that like ideas must be inborn in the mind. Descartes also worked out arguments intended to show that extension and related features (most notably of all, shape and motion) belong to these class of ideas, whereas this is not the case for colors and all remaining purely sensory ideas (Descartes' line of reasoning has been presented in §4 and §6). According to Descartes, whereas shape and like features could indeed be both sensed *and* understood (i.e. apprehended by the pure understanding independently of the body), colors and all the remaining proper sensibles of the Aristotelian tradition were confined to sensory apprehension alone. The argument, as the first part of this work which is going to conclude has shown, is extremely articulated, so that it comes as no surprise that Descartes himself (as shown in §§10-11) could sometimes couched it in terms of "clear and distinct" and "obscure and confused" perceptions, as if this could be enough to account for the entire reasoning. The improvement of the *Meditations* over Descartes' previous writings consists however precisely in having worked out a proper argument whereas in the *Rules*, the *World* and the *Discourse* Descartes basically contented himself with *claiming* that shape-ideas and color-ideas differ under some important regard, without however taking care to spell out how this difference was to be understood and to be grounded.

In the *Sixth Meditation* Descartes could thus claim to have "formed the distinct concept of corporeal nature", by establishing that the essence of material substances consists in extension. But what is one to make of colors and all remaining purely sensory ideas? Most interpreters claim that, by proving that the essence of bodies consists in extension, Descartes thought to have thereby also proven that bodies are nothing but extended, so that "redness", "hotness" and similar properties posited by the Aristotelians would have to be ruled out to make room for Descartes' new physics, entirely and exclusively based on the properties of extension. This reading of the *Meditations* is so common and inveterate that even some of the most careful

scholars have subscribed to it almost in passing, as if this could go without saying.[6] In the second part of this work I intend however to show that the thesis that bodies are *nothing but* extended substances does not launch Descartes' physics: it concludes it. Although the "distinct concept of corporeal nature" is supposed to include everything that is clear, this is indeed for Descartes no reason enough to rule out what is non-clear from the properties of bodies. As shown in detail in the previous chapters, Descartes admitted in fact no rule of falsity alongside his rule of truth. The *Meditations* have established (at least according to Descartes' lights) that colors are non-essential to bodies. To argue therefrom for the claim that bodies are non-colored *simpliciter* would however have been a major stretch of the argument, that Descartes took care never to make.

In the second part of this work I start by showing that the doctrines of the *Meditations on first philosophy* interpreters have traditionally construed as arguments for the claim that bodies are nothing but extended substances (such as the concept of a material falsity of sensory ideas, for example, or Descartes' alleged "causal unlikeness" principle between sensations and the properties of bodies these sensations are about) do not in fact establish this conclusion. I argue that, as a matter of fact, Descartes has never conceived of these alleged "arguments" as sufficient to establish by themselves the ultimate thesis of his metaphysics of corporeal substances. Descartes rather regarded to them as steps (some of which additional, some of which strictly necessary) to ground an argument that was nonetheless nowhere to be found in the *Meditations* themselves. After having argued for this reading, I thus proceed to show where the actual argument takes place, and how exactly it was intended by Descartes to work. Arrived at the uttermost limits of *prima philosophia*, Descartes believed that it was in fact time for his 'natural philosophy' to take over.

[6] See for example Étienne Gilson, *Études sur le rôle de la pensée médiévale dans la formation du système cartésien* (Paris: Vrin 1930), 19. Alison Simmons, "Are Cartesian Sensations Representational?", *Noûs* 33 (1999), 352, 357.

II. The Anatomy of the World

The Role of Optics in Descartes' Metaphysics

And new Philosophy cals all in doubt,
The Element of fire is quite put out;
The Sun is lost, and th'earth, and no mans wit
Can well direct him, where to looke for it.
And freely men confesse, that this world's spent,
When in the Planets, and the Firmament
They seeke so many new; they see that this
Is crumbled out againe to his Atomis.
[…]
Sight is the noblest sense of any one,
Yet sight hath onely color to feed on,
And color is decayd.

John Donne, *An Anatomy of the World*

§13. The 'royal road' to Descartes' theory of bodies

The reading of the *Meditations* presented in the first part of this work should have disclosed the pondered sophistication of Descartes' line of reasoning about the nature of bodies. Descartes' celebrated *ordre des raisons* has proven to be even more complex than expected, so that only by going to great pains was it possible to single out and articulate the many reasons that were intended to make the argument work. So complex was the argument, that without Descartes' own remarks about its intended logic, many a time it would admittedly have been quite difficult, if not outright impossible, to adjudicate between conflicting interpretations. Most of these precious statements by Descartes are of course to be found in his *Replies* to the *Objections* to the *Sixth Meditations*, which taken together constitute by far the most extended part of the 1641 work. Descartes' comments on his text in response to the difficulties and challenges raised by his first readers were not, however, confined to these seven sets of replies alone. Most of the letters of the time deal indeed precisely with the same issues. As a matter of fact, the very divide between letters and published responses is way more problematic than one could naively take it to be: Descartes' reply to the so-called "Hyperaspistes" in response to the letter of July 1641, by way of instance, was not inserted in the 1641 edition only because Descartes' text arrived in Paris after August 28th, when Michel Soly accomplished the printing.[1] On the other hand, Descartes' January 12th 1646 letter to Clerselier in reaction to some more objections brought by

[1] See Adam's remarks on the issue in AT III 421-22.

Gassendi was included in the 1647 French edition and his letter to the French translator of the *Principia*, Claude Picot, became the preface of the 1647 *Principes* (followed by the letter – one more letter – to Elisabeth, which already functioned as a dedication in the 1644 Latin edition).[2] Most of Descartes' letters – like most letters of the thinkers of the time – should not in fact be approached as private texts and documents of a one-on-one dialogue, but were intended right from the beginning as official statements. There are, of course, amidst the five volumes of the correspondence, some philosophical letters which Descartes had not intended to be made public: most of his letters to Regius, for example, or the letter to Mesland on the Eucharist, which Descartes expressly asked his correspondents to keep private.[3] On the other hand, though, the by far most consistent exchange of the correspondence (Descartes' letters to Mersenne, of course) is openly to be read as a dialogue and confrontation with the Paris scientists who gathered around the latter – the so-called "Mersenne's Circle" – rather than the extant fragments of Descartes' causal talk with a friend. There are indeed no major differences in tone between Descartes' usual letters to Mersenne and the *Second* and *Sixth Replies*, where Descartes discusses the difficulties concerning the *Meditations* raised by the very same group of thinkers, foremost Mersenne himself. Descartes' late exchange with Henry More, to add one more example, is indeed to be approached on a par with the better-known Leibniz-Clarke exchange, they both having been understood right from the beginning as a public debate by their authors. Finally, another crucial piece of Descartes' epistolary, such as the letters to Elisabeth of Bohemia and to Christina of Sweden, had unmistakably been written by Descartes while having clear in mind that these texts would be circulated among the entire intellectual entourage gathering around his highest-ranking correspondents. Descartes' letters are indeed a very serious affair.[4]

At the same time, though, in the letters Descartes could allow himself more liberties than in the published texts, whose audience was of course larger and, in most cases, less sympathetic. In the letters Descartes could indeed depart for a moment from the strictures of the *ordre des raisons* and expand with the readers who shared at least some of his ideas and polemical targets on the intended implications of his argument and on its "venom". It is indeed a letter to Mersenne's Circle to inform us that the *Meditations* artfully hid "all the foundations of his

[2] See, respectively *Meditations*, AT IX-1 202-17. *Principes*, AT IX-2 1-20.

[3] Cf. To Mesland, 9 February 1645; AT IV 165.

[4] On the importance of the correspondence for understanding Descartes' philosophy, see Jean-Robert – Giulia Belgioioso – Carlo Vinti eds., *La biografia intellettuale di René Descartes attraverso la "Correspondance"* (Napoli: Vivarium 1999).

physics", at the same time pleading with Mersenne to keep this within his close circle of anti-Aristotelians.[5] In his published works Descartes was indeed quite reticent about the extent of his opposition to Aristotelism, trying to belittle as much as possible the novelty of his claims (as especially clear from the conclusive sections of the *Principles*).[6] Descartes' argument that bodies are nothing but "extended things" proves accordingly less perspicuous than one would have expected it to be, especially given its importance for Descartes' philosophy as a whole: if its conclusion is clear enough, it is yet "exceedingly difficult to determine where exactly the arguments are taking place", to the point that a recent interpreter qualified Descartes' line of reasoning about the nature of bodies as "nearly invisible".[7] Interpreters are indeed still debating the point, and the next chapters show how diversified the strategies they have advanced to deal with the issue happen to be. Not that Descartes appears to be short of arguments for this claim. The problem, as a matter of fact, is the opposite: Descartes seems indeed to have put forward quite a few of them, and some very different ones, to the point that it is difficult to figure out how these manifold arguments were intended to work together for the same conclusion. Nor is it clear how each of them was precisely intended to work by itself.

In this case too it is in a letter to come to rescue, by spelling out in unmistakable terms the logic of Descartes' argument. The letter, dated 26 February 1649, is an all-important one and one of Descartes' last texts, directed to Christina of Sweden via Chanut: Descartes was to die one year later at Christina's court in Stockholm, because of a disease he got while taking care of Chanut who had caught it first (if we are to trust Baillet). Descartes wrote it upon being informed by Chanut that the Queen was going to undertake the study of his *Principles of Philosophy*, and included some inestimable suggestions about the overall argumentative structure of this work.

The structure of the treatise is indeed quite complex, also because Descartes had at some point to abandon the original plan of the work, as well as its working title. Descartes had in fact originally conceived of it as his own *Summa philosophiæ*, which in his intentions was to replace the Aristotelian textbooks of the time.[8] The original project would have accordingly

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[5] To Mersenne, 7 February 1641; AT III 298; K 173*: "But, please, this should not be said, for that might make it harder for supporters of Aristotle to approve them. I hope that readers will get used to my principles without noticing, and recognize their truth, before they realize that they destroy the principles of Aristotle".

[6] See especially *Principia* IV 200; AT VIII-1 323-24.

[7] Lisa Downing, "Sensibles Qualities and Material Bodies in Descartes and Boyle" in Lawrence Nolan ed., *Primary and Secondary Qualities: The Historical and Ongoing Debate* (Oxford: Oxford University Press 2011), 110.

[8] Cf. To Huygens, 31 January 1642; AT III 782; K 209-10: "Perhaps these scholastic wars (*ces guerres scolastiques*) [Descartes just mentioned Pere Bourdin's *Seventh Set of Objections*] will result in my *World* being brought into the

encompassed *six* parts: a first one (*De principiis cognitionis humanæ*) devoted to first philosophy and which was supposed to cover the entire *Meditationes de prima philosophia*, and five more chapters on natural philosophy. The first part, as Descartes writes in the same letter to Christina, is indeed nothing but an *abrégé* of the 1641 work.[9] The second part should have laid the foundations for pure physics (*De Principiis rerum materialium*), whereas the remaining four would have been devoted to the main empirical natural sciences: the third part to astronomy and physical optics (*De Mundo adspectabili*); the fourth to geology, chemistry and magnetism (*De Terra*); a fifth part to botany and zoology; the sixth and final one to the man, an enhanced version of Descartes' *Treatise on Man*, completed in 1633 but still unpublished after Galileo affair.[10] Descartes, however, was not entirely satisfied with his theory about plants and animals and, more in particular, he seems to have had difficulties accounting for the formation of the fetus – that is, for the formation of life – a problem he had been troubled by since his thirties.[11] Eventually, Descartes

world. It would be out already, I think, were it not that I want to teach it to speak Latin first. I shall call it *Summa Philosophiæ* to make it more welcome to the Scholastics, who are now persecuting it and trying to smother it before its birth. The [Protestant] ministers are as hostile as the Jesuits".

[9] To Chanut, 26 February 1649; AT V 291: "sa première partie ne soit qu'un abrégé de ce que j'ai écrit en mes *Méditations*". The first part plus the first sections of the second (*Principia* II 1-4), to be fully accurate, where Descartes proves the existence of bodies and restates a slightly modified version of the wax-argument (more on this in the next chapter).

[10] For a reconstruction of the fifth and sixth part of the *Principia* from the *Passions de l'âme* (1649) and Descartes' copious manuscripts on scientific questions, see Stephen Gaukroger, *Descartes' System of Natural Philosophy* (Cambridge: Cambridge University Press 2002).

[11] Cf. AT XI 503. Not to say from his twenties, since the problem was apparently implicit already in the *Traité de l'Homme*, wherein Descartes took as a starting point an adult man; cf. To Mersenne, 9 March 1639, AT II 525: "et si j'étais à recommencer mon Monde, où j'ài supposé le corps d'un animal tout formé, et me suis contenté d'en montrer les fonctions, j'entreprendrais d'y mettre aussi les causes de sa formation et de sa naissance"; cf. *Traité de l'Homme* 1, AT XI 119-202. An analogous complaint has already been raised by Descartes in his *Discours de la méthode* 5, AT VI 45-46. In his last years, actually, Descartes said to have given up writing the planned fifth part of the *Principia* because of the overwhelming amount of material; cf. *Conversation with Burman*, 16 April 1648; AT V 170-171: "quin etiam in ipso *Animalis Tractatu*, in quo hoc hieme laboravit, id animadvertit: cùm enim solùm animalis functiones explicare vellet, vidit se id facere vix posse sine eo quod animalis conformationem ab ovo explicare necesse haberet, quam ex suis principiis, ita sequi advertit, ut rationem cur oculus, nasus, cerebrum etc., essent, dare posset; et plane perspexit naturam rerum ex suis principiis ita constitutam esse, ut aliter non posse. Quæ omnia quia persequi tam fuse nolebat, ideo illum tractatum scribere supersedit". The reference here is to Descartes' *Description du corps humain* (1648) and to the contemporary *De la Formation du Foetus*, or "*de l'animal*" (perhaps to be regarded as an appendix of the former); cf. AT XI 217-90. Descartes dealt with the fetus formation also in his ***Primæ cogitationes circa generationem animalium***; for a survey of Descartes' biology, see Dennis Des Chene, *Spirits and Clocks: Machine and Organism in Descartes* (Ithaca, NY - London: Cornell University Press

resigned himself to abandon the original project and released the first four parts only, which were supposed to finish with a detailed account of magnetism, which does in fact fill a quite long stretch (some fifty-section long) of the fourth and last part: Descartes' planned *Summa* of philosophy had turned into a treatise on the *Principles* of this science.[12]

Descartes, however, attached thirty more sections to the fourth and now final part. Whereas a few of them strive to prevent the charge of being an atomist, or a revolutionary, or elucidate some important aspects of Descartes' epistemology of empirical sciences (and appear therefore to be indispensable even for the abridged version of the treatise),[13] a dozen of them seem to have been grossly juxtaposed by Descartes without any apparent reason. They deal with the sensibles, the senses and with the anatomy of man and should therefore have appeared in the sixth part of the work and brought to completion Descartes' *Summa*, had this been accomplished. The reader is under the impression that Descartes had simply attached to the main body of the fourth book a sort of "appendix", which he had probably already written and was not intending to leave unpublished. The letter to Christina nonetheless suggests a completely different reading of this set of propositions.

According to a well-known anecdote, once asked by King Ptolemy if there was a shorter path to learning geometry than his *Elements*, Euclid firmly replied that "there is no royal road to geometry". Descartes, on his part, was far more indulgent towards the Queen of Sweden, pleased that she was going to devote some of her time to his work. He recommended that she should not waste her time on the laws of motion, though, nor linger on the metaphysical argument, nor refer to the more detailed exposition of the *Meditations*, which could have resulted "difficult and tedious" to Her Majesty.[14] Beside patronizing Christina and emasculating his work,

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2001). Descartes, in many of the published texts, endeavored to circumvent any theological criticism (according to Christian Revelation, Adam was in fact created an adult and, similarly, the world at the beginning was not a pure Chaos), by insisting that he conceived it as nothing but a heuristic hypothesis; see, for example, *Principia* III 45; AT VIII-1 99-100.

[12] Cf. *Principia* IV 133-187; AT VIII-1 275-315.

[13] In particular, his key concept of "moral certainty"; cf. *Principia* IV 204 (*Sufficere si de insensibilibus qualia esse possint, explicuerim, etsi fortè non talia sint*); 205 (*Ea tamen quæ explicui, videri saltem moraliter certa*); 206 (*Imò plusquam moraliter*). Descartes wards off accusations in sections 200 (*Nullis me in ea* [*tractatione*] *principiis usum esse, quæ non ab omnibus recipiantur; hancque Philosophiam non esse novam, sed maximè antiquam & vulgarem*); 202 (*Democriti Philosophiam non minùs differre à nostrâ, quam à vulgari*) and in the final one, the 207, whose title reads *Sed me omnia mea Ecclesiæ auctoritati submittere*; cf. AT VIII-1323-29.

[14] In the preface to the French *Principles* Descartes went even further, recommending his reader "first of all to go quickly though the whole book like a novel (*ainsi qu'un roman*), without straining his attention too much or stopping

by turning it into a treatise on comets and salts, Descartes spelt out more straightforwardly than ever before the overall argumentative strategy of the *Principles* (and, more in general, his argument that bodies are nothing but extended things):

> While reading the book, finally, it is mandatory to keep in mind that, although I take into account, in bodies anything but the magnitudes, shapes and movements of their parts, I do nevertheless claim to explain there the nature of light, of heat and of all other sensible qualities. For I assume (*présuppose*) that these qualities are only in our senses – as tickle and pain are – and not in the objects we sense, wherein nothing is to be found apart from certain shapes and motions, which cause the sensations we name "light", "heat" and so on. I explained and proved (*expliqué et prouvé*) this claim only at the end of fourth part of the work, even though, in order to understand it better, it would be appropriate to notice and to keep notice of it from the beginning of the treatise.[15]

Descartes' statement is unmistakable: the first book of the *Principles* does not establish that bodies are *nothing but* extended things, it only argues for the more qualified conclusions that they are extended things with a shape, in motion or at rest in relation to each other, without yet denying to them properties like colors and all sensible qualities posited by the Scholastics (such as hotness or heaviness). In the letter to Christina Descartes indeed makes crystal-clear that in the first book of the treatise he is not *passing over in silence* a conclusion he took to have already established. At this stage of the argument Descartes thought he could simply take no stance on the issue. At the same time, still, in order to better understand his overall line of reasoning he wanted his readers (Christina, Chanut, and all of us) to be aware that he was *building up an argument* that aimed at that conclusion. Contrary to what is normally assumed, that bodies are nothing but extended things is not, therefore, the starting point of Descartes' physics, but its crowning achievement: simply *assumed* in the first book, it is *established* only at the end of the fourth. The letter to Christina makes clear that Descartes did not therefore append these sections just to supplement his treatise, but to accomplish it, by finally establishing his theory on the nature of bodies. Moreover, given that the first book of the *Principles* (according to Descartes' own words in the same letter) is just a "summary" of the *Meditations*, the following inference seems obvious: the *Meditations* too, by themselves, do not prove that bodies are shaped and yet not colored. That they are, namely, *nothing but res extensæ*. This has already been proven to be the case by the detailed reading of the *Meditations* developed in the first part of this work,

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at the difficulties which may be encountered. The aim should be merely to get a hint (*savoir en gros*) of what are the topics I have dealt with"; *Principes*; AT IX-2 11-12; CSM I 185*.

[15] To Chanut for Christina of Sweden, 26 February 1649; AT V 291-92 (my translation).

but one has here one more decisive piece of evidence – coming directly from Descartes – that this reading is indeed right. Descartes' statement is plain, and yet scholars have largely ignored the letter to Christina, or failed to appreciate its importance: if one recent scholar has happened to spend some time on it, it was indeed only to argue that the letter must be dismissed as "misleading". "Misleading", according to Downing, inasmuch as "it is simply not true… that Descartes makes no earlier attempt to demote the sensible qualities".[16] But why on earth should Descartes have ever understated and misconstrued for the worse his own reasoning, by claiming that its intended conclusion was only reached in the fourth part of the treatise, if this was not the case?

If this were the case, though (as it is), what is one supposed to do of the alleged arguments presented in the *Meditations* and, in a slightly revised form, at the beginning of the *Principles*? And, even more importantly, how can some scattered remarks on physiology, badly appended to a small treatise on magnetism, have been intended by Descartes to establish one of the grandest claims of his philosophy? The following chapters are devoted to answering these questions and to dissect Descartes' line of reasoning, by first clearing the ground from some *alleged* concurrent arguments for the same conclusion taken from 'first philosophy', to then spell out what Descartes himself declared to be his only true argument: the 'natural philosophical' argument.

[16] Downing, "Sensibles Qualities", 114.

[§§14-17] Arguments from 'First Philosophy'

As every expert in the field knows too well, the literature on Descartes' argument that bodies are extended things and nothing more than that is pretty much endless, so that it would be virtually impossible (and maybe not even that useful) to present a reasoned survey of all the different views on the topic. In what follows, accordingly, only four arguments are discussed, which I take to be the most significant among the ones presented in the literature – among the ones I am aware of, at least – either because of their intrinsic interpretative and systematic relevance or, if anything else, because of their influence on the debate. They are distinguished into two classes: *phenomenological arguments* and *metaphysical* ones. This finer-grained distinction of Descartes' alleged arguments from 'first philosophy' is largely indicatory, and should not be understood in terms of an *aut aut*: as it has already pointed out, Descartes has in fact never used the term 'phenomenology', and in quite a few occasions appeared to simply equate *prima philosophia* with 'metaphysics'. Independently of the terms adopted, Descartes' alleged arguments in the *Meditations on First Philosophy* can be grouped into two main classes. On the one hand, arguments grounded on considering *ideas* as such, apart from whether the objects these ideas are about exist or not *in rerum natura* (and which accordingly precede Descartes' demonstration that bodies exist). On the other, arguments which revolve around *metaphysical principles* such as Descartes' axiom that the objective reality of an idea must be eminently or formally contained in its cause (to which Descartes appealed to prove that God and the external world exist), or which were intended to question the received Scholastic notions of real quality in the light of Descartes' conception of substance and its modes. Accordingly, it seems expedient to distinguish – at least for the sake of exposition – between two sorts of arguments (or alleged arguments) from 'first philosophy' in favor of the thesis at stake: *phenomenological* and properly *metaphysical* arguments. As for the former category, the ones discussed are (i) the so-called "separability test", famously exemplified by the wax-example of the *Second Meditation* and taken on again at the beginning of the second book of the *Principles*; and (ii) Descartes' concept of a *material falsity* of sensory ideas, introduced in the *Third Meditation*. As for the metaphysical arguments, the most relevant readings advanced in the literature revolve around (iii) Descartes' alleged principle of *causal likeness*, supposedly endorsed by Descartes always in the *Third Meditation*; and (iv) Descartes' difficulties with the concept of a *real quality*, that Descartes explicitly addresses in *Sixth Set of Replies* to the *Meditations* and that he spells out in even greater detail in the other writings of the 1640s (first of all the *Principles* and the letters).

Besides these four clear-cut positions there are of course also some hybrid accounts, and as a matter of fact already the last one just mentioned can be taken to be an epistemological argument of a kind, partly based as is on real qualities' action of material substances being "unintelligible" to us. There are of course, moreover, interpreters who think that Descartes defended more than one of the arguments just mentioned, either at a time or at different stages of his life. The issue of Descartes' "changing mind" on the topic is indeed of the utmost importance, and is addressed as it deserves in what follows (see especially §26). As for the present, though, it is important to be clear about how the above-mentioned arguments – or alleged ones – are intended to work. Being all of them to be found in the *Meditations* (a few complications aside as for the fourth), for the time being the issue of chronology can indeed be left aside, to focus first of all on nothing but Descartes' masterpiece.

[§§14-15] Phenomenological Arguments

Descartes' (purported) phenomenological arguments to prove that bodies are nothing but corporeal substances are usually taken to be of two kinds: (i) an argument based on studying the relation between our manifold ideas of a body in order to determine which ones can be eliminated from the notion of a body without making it meaningless and which, on the other hand, are inseparable from it – the so-called *separability test*; (ii) one more argument which is said to be the straightforward and intended consequence of Descartes' condemnation of sensory ideas as *materially false*. Being both based on nothing but the perceiver's *ideas* of a body, the two arguments can therefore be regarded as instances of *phenomenological* arguments in the sense already explained in introducing this work. The first part of this work has moreover already shown that for Descartes "we cannot have any knowledge of things except by the ideas we conceive of them; and consequently, that we must not judge of them except in accordance with these ideas".[1] Accordingly, the study of Descartes' supposed phenomenological arguments must logically precede any consideration about the corresponding metaphysical ones, which will therefore be discussed only in a subsequent section.

§14. Separability test

Descartes' first alleged argument to prove that bodies are *res extensæ* and nothing but *res extensæ* is the so-called "separability test" argument – or "argument for elimination", as is also known in the literature – which enjoyed indeed quite of a fortune in the Early Modern Age: already to be found in Galileo (from whom Descartes is likely to have taken it), it was later to be used among the others by Locke. Its first formulation in Descartes' writings is said to be found in the *Second Meditation* with the celebrated wax example, which Descartes would have been taken up again at the beginning of the second book of the *Principles*, this time spelling it out with reference to a stone. The argument, in a nutshell, would claim that, of the many qualities the cognizer perceives in body, some could be "eliminated" by a thought-experiment without thereby destroying the notion of the nature of this body, whereas some others would prove to

[1] To Gibieuf, 19 January 1642; AT III 476; K 202. This piece of Descartes' philosophy has been discussed in §0.

be conceptually inseparable from it and should accordingly be singled out as the only properties essential to a material substance and in fact as its only ones. A simple study of how our ideas of a body relate would accordingly be enough, by itself, to prove that bodies are nothing but extended substances. The wax and the stone examples would accordingly suffice to establish Descartes' physics.

As is straightforward to realize, if this would be the case in his letter to Christina of Sweden Descartes would have undermined his own argument, all the more with no apparent reasons to do so. There is however one even more compelling piece of evidence to counter this reading. As already shown, in the *Synopsis* to the *Meditations* Descartes warned in fact his reader that it will take the entire work – and, more specifically, the *Second*, the *Fifth* and the *Sixth Mediation* – to "establish a distinct concept of corporeal nature".[2] By qualifying the concept of corporeal nature constructed (*formatur*) at the end of the *Meditations* as "distinct", Descartes however only meant that this concept contained nothing but what is clear, without though thereby excluding from the properties of bodies the qualities – such as colors – whose ideas has proven to be *non*-clear. Had the wax example established what it is sometimes taken to prove, it would follow that Descartes in presenting the *Meditations* badly and studiously misconstrued their line of reasoning: the *Second Meditation* taken by itself would indeed achieve a much stronger conclusion that what Descartes professed to be the result of all the *Six Meditations* taken together. That Descartes had no reasons whatsoever to mischaracterize his position for the worse, at least twice, and in so important texts, is too obvious an objection to have to expand upon it. The consequence is clear: Descartes, by the examples of the wax and of the stone, did not intend to prove that colors and the analogous features are not properties of bodies – not the colors as we perceive them to be, at least (the same considerations, obviously enough, apply to all the other alleged arguments from first philosophy considered in the next chapters).

The well-known wax example was indeed intended by Descartes, and this too is well-known, to prove that "the nature of the mind is better known than body", as expressly stated by the title of this *Second Meditation*. The interiorized opponent against whom the meditator is fighting and will be fighting throughout the work is in fact having especially hard times with the thesis that this "unknown myself, which cannot be imagined" (*nescio quid meî, quod sub imaginatione non venit*) would still be better known than the bodies he touches with his hands and of which he is able to form a mental image – i.e. to represent to himself as with a certain figure.[3] Descartes, accordingly, sets for himself the task to show that also in the case of material substances their

[2] *Meditationes*, *Synopsis*; AT VII 13, 13-15.

[3] *Meditationes* II; AT VII 28, 19-24; CSM II 19*. For Descartes' theory of the imagination, see above §§5-8.

essence (*quid sit hæc cera*) is perceived only "imperfectly and confusedly" by the senses and the imagination, and can be apprehended in a "clear and distinct" way only by the mind's cognitive power in its purity – i.e. by the intellect (*solius mentis inspectio*).[4] Descartes starts thus by considering a piece of wax fresh from the honeycomb, as presenting itself with a vast array of properties that affect all five the senses, contrary to what happens with the just mentioned *nescio quid meî*: "it has not yet quite lost the taste of the honey; it retains some of the scent of the flowers from which it was gathered; its color, shape and size are plain to see; it is hard, cold and can be handled without difficulty; if you rap it with your knuckle it makes a sound. In short, it has everything which appears necessary to enable a body to be known as distinctly as possible".[5] As put by the fire, though, all these properties melt away: "the residual taste is eliminated, the smell goes away, the color changes, the shape is lost, the size increases; it becomes liquid and hot; you can hardly touch it, and if you strike it, it no longer makes a sound". And yet according to everybody it is always the very same piece of wax:

> But does the same wax remain? It must be admitted that it does; no one denies it, no one thinks otherwise. So what was it in the wax that I understood with such distinctness? Evidently none of the features which I arrived at by means of the senses; for whatever came under taste, smell, sight, touch or hearing has now altered - yet the wax remains.

The meditator, in trying to determine what this something which persists through all these changes really is, turns therefore to the imagination. Dropping all proper sensibles, he focuses therefore on the different shapes that this piece of wax can take, the piece of wax being accordingly considered now "just as something extended, flexible, and mutable" (*nihil aliud quam extensum quid, flexibile, mutabile*). Even with this qualification in place, though, it is objected that the number of shapes imagination can run through is quite limited, so that imagination too would be unable to ascertain the persistence of this one and the same piece of matter throughout all of his possible changes: imagination succeeds in grasping this piece of wax as capable of being round, or squared, or triangular, but is unable to grasp it as something "flexible and mutable" *in general*.[6] The same is the case for extension. Put by the fire, the apparent

[4] *Ibid.* AT VII 31, 17-18.

[5] *Ibid.* AT VII 29, 8-15.

[6] *Ibid.* AT VII 31, 3-10; CSM II 20-21*: "But what is meant here by 'flexible' and 'changeable'? Do I *imagine* that this piece of wax is capable of changing from a round shape to a square shape, or from a square shape to a triangular shape? Not at all; for I can grasp that the wax is capable of countless changes of this kind, yet I am unable to run

extension of this piece of wax appears indeed to change "for it increases if the wax melts, increases again if it boils, and is greater still if the heat is increased". Descartes, accordingly, raises a question from whose answer depends his entire metaphysics of bodies: "And what is meant by 'extended'? Is the extension of the wax also unknown?". Descartes, though, does not offer any answer to this question at this stage of the enquiry, as everything he had set for himself to prove is that the true nature of material bodies is not perceived "by an eye glance" (*visione oculi*) but only through a "purely mental insight" (*solius mentis inspectione*), as he thought to have already shown to be the case for the *nescio quid meî* which his opponent found so puzzling.[7] In his replies to Hobbes Descartes makes explicit that the aim of the wax example was not in fact to establish what the essence (*ratio formalis*) of material bodies consists in, but only that the nature of this essence is to be determined from the vantage point of the understanding.[8] In his reply, actually, Descartes expressly claims that "shape does not pertain to the formal definition of the wax": as Descartes explains elsewhere one could indeed think of all matter as making up *one*, *indefinite* body, which would accordingly have no shape at all.[9] The example of the wax, therefore, cannot be taken to imply that whatever does not constitute the "formal definition" of a body is *eo ipso* to be excluded from the properties of bodies. Were this the case, Descartes would indeed have just established that bodies do not have a shape, a conclusion clearly as far as possible from his intentions. Finally, it should be noticed that in discussing the wax example Descartes regarded as already established the distinction between intellect, imagination and sensibility which (as shown in §§5-8), he justifies only in the *Sixth Meditation*. Descartes himself, indeed, admitted that he would not have been entitled to take up the issue at that stage of the enquiry, and that for the time being he was just arguing from the objector's premises against the objector's conclusion, before coming back once again to the rigorous *ordre des raisons*.[10]

The different position of the "separability test" within the *Principles* explains indeed why Descartes can on the other hand appeal in this case to a reworked version of the way example to argue that "the nature of body consists not in weight, hardness, color, or the like, but only in extension (*in solâ extensione*)". So reads the title *Principles* II 4 where the argument first shows up in the treatise, to be then taken up again in a slightly revised form a few propositions later, at

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through this immeasurable number of changes in my imagination, from which it follows that it is not the faculty of imagination that gives me my grasp of the wax as flexible and changeable" (emphasis added).

[7] *Ibid.* AT VII 32,4-6; CSM II 21*.

[8] *Responsiones* III; AT VII 175, 16-21.

[9] *Ibid.*

[10] Cf. *Meditationes* II; AT VII 29, 28 - 30, 2; CSM II 20.

Principles II 11, where Descartes exemplifies it by considering a stone. Whereas in the *Second Meditation* Descartes was not properly entitled to distinguish between the different faculties of the mind, the stone example comes indeed after an "summary" of the entire 1641 work. Descartes could therefore claim to have established that "extension in length, breadth, and depth constitutes the nature of corporeal essence" already at *Principles* I 53, by means of a very sketchy version of the sophisticated line of reasoning presented in the first part of this work. The "separability test" as presented in the *Principles* is indeed to be taken only as one more argument, and a not very compelling one, for the same conclusion already established in the first book of the treatise. From the fact that not all bodies are colored it can indeed only be concluded that color is not an essential feature of bodies, but it would be a major mistake to infer from there that all bodies that we perceive as colored do not actually possess any like a quality (i.e. that bodies are not as such colored as we perceive them to be). Aristotelians too were of course aware of the existence of the "transparent stones" mentioned by Descartes, but they never inferred therefrom that color is not a property of bodies. Analogously, Descartes' argument that a stone can become hot or cold without yet "losing its bodily nature" would have being granted by the Scholastics, for whom it would however have been easy to object that the stone (like all bodies) must still be either cold or hot. Furthermore, Aristotelians would have contended that for other material entities such as the elements being cold or hot was indeed an essential feature, this being for example the reason why warmed water started cooling down by itself as soon as removed from the heat-source: a "violent motion" in the category of quality (a "violent alteration", might the term be admissible) would accordingly be restored by the natural motion of water towards its own nature, which is of being cold and wet.

As the first case for his argument, Descartes mentions hardness, claiming both in *Principles* II 4 and in *Principles* II 11 that this property should be excluded from the nature of body "since if the stone is melted or pulverized loses its hardness without thereby ceasing to be a body".[11] As for hardness, indeed, "our sense only tells us that the parts of a hard body resist the motion of our hands when they come into contact with them" so that, Descartes claims, "if whenever our hands moved in a given direction, all the bodies in that area were to move away at the same speed as that of our approaching hands, we should never have any sensation of hardness (*nullam unquam duritiem sentiremus*)".[12] An opponent could fairly reply that the supposed inability to detect it evoked by Descartes' scenario does not constitute any sound argument to deny hardness to body. To Descartes' purely sensualistic treatment of hardness, his opponents could indeed

[11] *Principia* II 11; AT VIII-1 46, 8-10; CSM I 227.

[12] *Principia* II 4; AT VIII-1 42, 8-15; CSM I224.

object, as Henry More did, that they understood the notion in quite more abstract term, as closely connected with the notion of impenetrability (ἀντιτυπία).[13] Strict Aristotelians too would have readily granted Descartes that we come to know of this property of bodies by means of our senses, but this does not mean that this property (like all other physical properties) could be reduced to a sensation of the perceiver. Had we never experienced hotness by our hand, they would have objected, it would have nonetheless still been because of this properties that fire always tends upwards, in the direction of the uppermost sublunary sphere. Aristotelians, furthermore, also admitted in their physics occult properties, viz. properties – such as magnetism – that as such elude our senses, although we indirectly come to know about them though their perceivable effects. To Descartes' Gedankenexperiment to show that hardness is not intrinsic to bodies, Aristotelian could indeed malignly reply that the actual experience of the real world we are in would have by the same token sufficed to disprove Descartes' corpuscles. Challenged by More on the topic, Descartes had indeed to grant him that, although impenetrability is not an essential feature of bodies, it is yet something to be found in *all* material substances, and in *nothing but* material substances, the same way the ability to laugh is not a definitory property of man and yet is to be found in all rational animals, and only in them. Impenetrability, Descartes concludes by making good use of the logical categories he had been taught in La Flèche, should therefore count as a *proprium* of bodies – *viz.* as a property that among all sorts of beings only bodies possess, and which does not however express the essence of bodies, the same way "being able to laugh" falls short of defying the "rational animal".[14]

On a more general level, and foreshadowing an objection Berkeley will especially insist on, Henry More objected to Descartes that although I can think of a body – say, the piece of wax – with a different figure, it does not follow that the piece of wax can have no figure at all. Analogously, even though I can think of a body with a different color than it actually possesses, it does not follow that I can think of it with *no* color at all. Being of such-and-such a color might indeed be accidental to the body in question, but being colored (having *a* color) is not accidental to bodies.[15] At least for some material entities, being of a certain color and of no other does not moreover seem to be accidental at all, so that Late Scholastics could construe of whiteness

[13] For an in-depth study of the contrast between Descartes and More about how to conceive of impenetrability, see Jean-Pascal Anfray, "*Partes extra partes*: Étendue et impénétrabilité dans la correspondance entre Descartes et More", *Les Études philosophiques* 108/1 (2014).

[14] To More, 5 February 1649; AT V 269; K 361.

[15] More to Descartes, 11 December 1648; AT V 239 (I say only "foreshadow" because More explicitly discusses in his letter only hardness and softness, and hotness and coldness, and given the theory expressed therein is even doubtful that it was ready to extend his claim to properties like colors).

as an "inseparable accidents" of swans: despite not being part of swan's essence, these thinkers pointed out that 'being white' was indeed to be found in any member of this species, and could not be stripped out of a swan if not at pains to come up with a different animal. As insightfully pointed out by Garber, the cases of *propria* and "inseparable accidents" make indeed clear that the validity of the separability text to track down essences was highly disputable for the standards of the time, so that in order to address it properly Descartes would have been required to enter quite a bit into the Scholastic theory of properties and predication.[16] The topic was simply too intricated for Descartes possibly to have thought to have adequately addressed it in one proposition of a few lines. Henry More, accordingly, denounced Descartes' reasoning as "cunning and almost sophistical", to which Descartes replied slightly resentful that

> I used it only to refute the opinion of those who, like you, think that *all* bodies are perceptible by the senses. An opinion that, to my eyes, my argument refutes in a straightforward and decisive way. For a body can retain its whole bodily nature even if it does not present itself to the senses (*quamvis non sit ad sensum*) as soft or hard or cold or hot, indeed, as with no sensible qualities at all.[17]

As the follow-up of Descartes' reply confirms, in *Principles* II 4 it turns indeed out that Descartes did not intend to establish once and for all that bodies have none of the sensible properties we perceive them to have, but only that there are bodies besides the ones we perceive, thereby starting to make a case for the corpuscles which will feature so prominently in the rest of the treatise. Descartes contended in fact that defining bodies in relation to the senses – maybe even straight away as *substantiæ sensibiles*, as proposed by More – would misconstrue the matter, since

> the nature of bodies certainly does not depend upon our senses, since it could exist even though there were no humans beings, and so I do not see why you say that it is altogether necessary that all matter should be perceptible by the senses. Just the opposite is the case: all matter is completely imperceptible if it is divided into parts much smaller than the particles of our nerves and the individual parts are given a sufficiently rapid movement.[18]

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[16] Daniel Garber, *Descartes' Metaphysical Physics* (Chicago - London: University of Chicago Press 1992), 77-80.

[17] To More, 5 February 1649; AT V 268; K 360*: "Meumque illud argumentum, quod *scaevum & ferme sophisticum* appellas, adhibui tantum ad eorum opinionem refutandam, qui tecum existimant *omne* corpus esse sensibile, quam, meo judicio, aperte & demonstrative refutat. Potest enim corpus retinere omnem suam corporis naturam; quamvis non sit ad sensum molle, nec durum, nec frigidum, nec calidum, nec denique habeat ullam sensibilem qualitatem" (emphasis added).

[18] To More, 5 February 1649; AT V 268; K 360*.

The propositions immediately following *Principles* II 4 make in fact clear that Descartes main concern in this section of the treatise was to refute the received views about rarefaction and the void, expressly denounced as "prejudices" at *Principles* II 5. Without entering into the details of Descartes' account, the gist of Descartes' thesis is that a given quantity of matter does not come to have a bigger or smaller extension according to some alleged *rarefatio & condensatio*: if a same body happens at some point to occupy more space than before, this is indeed for Descartes only because some imperceptible corpuscles filled its pores, the way water fills a sponge. As he concludes at the end of his brief enquiry:

> To invent something unintelligible so as to provide a purely verbal explanation of rarefaction is surely less reasonable (*rationi consentaneum*) than inferring from the fact they rarefy the existence of pores or gaps which are made much larger, and supposing than some new body comes and fills them, even though we do not perceive this new body with any of our senses. *There is indeed no compelling reason to believe that all the bodies that exist must affect our senses*.[19]

Although at first glance Descartes' phrasing at *Principles* II 4 could suggest a much stronger conclusion, by taking into account the context of the stone example and the logic of these sections of the treatise (as made especially clear in the letter to More) it can therefore be safely concluded that Descartes did not take his passing remark about hardness as enough to establish that bodies are *nothing but* extended substances. It remains open to debate whether Descartes' potentially misleading phrasing of the argument was out of purpose or simply infelicitous. The matter is not completely relevant, though, and to a good extend unfathomable (although everything seems to suggest Descartes was acting out of malice). What only matters, is that in the light of what had just being said, of the many arguments presented in the previous sections and of the always to be remembered letter to Christina of Sweden, the separability test has

[19] *Principia* II 7; AT VIII-1 44, 1-10; CSM I 226 (emphasis added). In *Principles* II 5 Descartes mocks some unnamed philosophers "who are so subtle that they distinguish the substance of a body from its quantity, and then distinguish this quantity from extension" in order to account for condensation and rarefaction. His polemical target, as argued by Menn, is most likely Suárez; cf. Stephen Menn, "The Great Stumbling Block: Descartes' Denial on Real Qualities" in Roger Ariew – Marjorie Grene eds., *Descartes and His Contemporaries: Meditations, Objections, and Replies* (Chicago - London: University of Chicago Press 1995), 196: "Suárez thinks it [extension] is neither the distinctness of the parts of the substance, nor their *actual* extension or size, but their *aptitudinal* extension, that is, their *tendency* to occupy a determinate amount of space, and to resist being compressed further or becoming coextended with each other; so a substance can be rarefied or condensed while keeping the same quantity". As well-known, Descartes thought that all pieces of matter are (at least in principle) always divisible, and rejected accordingly the existence of atoms – the Greek term meaning precisely "indivisible".

proven unable to establish by itself whether bodies are nothing but extended things, and that Descartes has never intended to appeal to nothing but it to ground so momentous a conclusion. The conclusive argument of Descartes' theory of bodies (provided there is any) is still to be found.

§15. Material falsity

Among the most debated issues of Descartes' philosophy is the concept of a material falsity of sensory ideas. As already pointed out in the first part of this work (most detailly of all in §6), Descartes distinguished indeed the ideas of bodies' properties into two sets. On the one hand, the "clear and distinct" idea of "size (*magnitudo*) – or extension in length, breadth and depth; shape, which is a function of the boundaries of this extension"; position; motion and the like. On the other, the ideas of all proper sensibles: "light and colors, sounds, smells, tastes, heat and cold and the other tactile qualities", claiming that while the former would be perceived in a "clear and distinct" way, this would not be the case as for the purely sensory ideas.[1]

In reason of these shortcomings, Descartes claimed that the concept of falsity should be extend from judgments (to which is was standardly attributed) as to apply right away to the "obscure and confused" ideas of the senses. Descartes, accordingly, qualified this instance of falsity as "material" precisely in order to distinguish it from the standard case of falsity – the so-called "formal" one. The concept of material falsity was not of Descartes' own making, and its theorization in the Scholastic authors Descartes had studied in La Flèche has been carefully documented by scholars (Descartes himself pointed out in the *Replies* that the concept was to be found in Suárez).[2] Its quite widespread use does not make the concept less problematic, though, at least not within Descartes' argument, who in the very same *Third Meditation* has indeed stated as clearly as possible that only judgments can bear a truth-value: ideas by themselves, claims Descartes, are indeed neither true nor false.[3] One of Descartes' first objectors, possibly the one who knew best the Scholastic background of this concept, objected that Descartes had fallen into a plain contradiction.[4] As a matter of fact, Descartes himself seemed to grant Arnauld that his phrasing in the *Third Meditation* was at least infelicitous. So infelicitous, actually, that in his reply Descartes rephrased the conceptual opposition described in the *Third Meditation* as between the "formal" and "objective" reality of an idea in terms of "material" and "formal" reality, by completely subverting his own terms of art.[5] Not yet satisfied by the solution, in the

[1] *Meditationes* III; AT VII 43, 21-22; CSM II 30.

[2] Cf. *Responsiones* IV; AT VII 235, 10-14; CSM II 164. On Descartes' sources for this concept and its reformulation of it, see at least Norman Wells, "Material Falsity in Descartes, Arnauld, and Suarez", *Journal of the History of Philosophy* 22/1 (1984): 25-50. David Clemenson, *Descartes' Theory of Ideas* (London: Continuum 2007), 77-91.

[3] Cf. *Meditationes* III; AT VII 37, 13- 28; CSM II 25-26.

[4] *Objectiones* III; AT VII 206, 10; CSM II 145.

[5] Cf. *Responsiones* IV; AT VII 232,12-19: "cum ipsæ ideæ sint formæ quædam, nec ex materia ulla componantur, quoties considerantur quatenus aliquid repræsentant, non *materialiter*, sed *formaliter* sumuntur; si vero spectarentur,

Preface to the *Meditations* (written after the *Fourth Set* of objections and replies had been collected), Descartes rephrased the opposition between "formal" and "objective" reality of an idea in terms of "material" and "objective" reality (with one more shift in vocabulary), to finally drop the claim and never bring it up again in any of his works.[6] In his reply to Arnauld, Descartes had indeed already downplayed the anomaly of this alleged additional form of falsity, arguing that sensory ideas can be qualified as false only insofar as they "provide subject-matter for a judgment" which turns out to be false (*judicio materiam præbeant erroris*).[7] It would therefore be only indirectly, and in relation to a judgment, that an idea could be qualified as "false" and, furthermore, only with the proviso that the kind of falsity here at stake is not of the proper – i.e. "formal" – kind but only a derivative and quite improper notion. The claim that ideas are *intrinsically* false (viz. false as such, prior to any judgment) would therefore have to be qualified to the point of altogether disappearing from Descartes' philosophy.[8]

Scholars have reasonably argued that in the *Third Meditation* Descartes seems nonetheless to defend a quite different and stronger concept of material falsity. Some of them, actually, went so far as to suggest taking Descartes' debate with Arnauld as a starting point to illuminate Descartes' theory of sensory representation in general.[9] As already pointed out in the first part of this work, the problem with most of these readings is nevertheless that they often happen to *assume as already established* that for Descartes bodies are shaped but neither hot nor cold. In so doing, though, readings along these lines turn without noticing the *explanandum* into the *explanans*, arguing as they are that, since for Descartes bodies are not cold (not in the way he

non prout hoc vel illud repræsentant, sed tantummodo prout sunt operationes intellectus, dici quidem posset materialiter illas sumi, sed tunc nullo modo veritatem vel falsitatem objectorum respicerent" (the topic had already been discussed in §0).

[6] In the *Preface* to the *Meditations* Descartes distinguishes between the idea "taken materially, as an operation of the intellect… or objectively, as the thing represented by that operation" (*materialiter pro operatione intellectûs… vel objective, pro re per istam operatione repræsentatâ*)"; AT VII 8, 20-23; CSM II 7*. For a detailed analysis of the problem, see Emanuela Scribano, "Descartes et les fausses idées", *Archives de Philosophie* 2 (2001): 259-78. Descartes will mentioned again this doctrine only when asked about it by Burman; cf. *Conversation*; AT V 152.

[7] *Responsiones* IV; AT VII 231, 10; CSM II 162.

[8] Cf. *Meditationes* III; AT VII 43, 26-27: "falsitatem proprie dictam, sive formalem, nonnisi in judiciis posset reperiri".

[9] For two very different and competing critical surveys of the most important positions of the topic, see Cecilia Wee, *Material Falsity and Error in Descartes'* Meditations (London - New York: Routledge 2006). Raffaella De Rosa, *Descartes and the Puzzle of Sensory Representation* (Oxford: Oxford University Press 2010). See also the classical Daniel Kaufmann, "Descartes on the Objective Reality of Materially False Ideas", *Pacific Philosophical Quarterly* 81 (2000): 385-408.

perceived them to be, at least), the idea of cold cannot but misrepresent its object. As the first part of this work has argued at length, Descartes' point was yet precisely to *prove* that bodies are extended and nothing but extended (neither colored nor cold, therefore) by considering the *ideas* we have of these bodies. The concept of a "material falsity" of sensory ideas, and all the more the claim that these ideas are perceived in an "obscure and confused" manner, cannot therefore *be explained* by appealing to what these concepts were in fact intended to *prove*, as this would count as a gross *hysteron proteron*. In order to figure out the logic of Descartes' line of reasoning in the *Meditations*, here as everywhere else, it is indeed essential to attend to the *ordre des raisons*.

At a closer look, one finds out that Descartes did not assert that all sensory ideas are (simply qua sensory) "materially false", but only made the case that *some* of these ideas *could* at some point turn out to be so:

> The idea [of cold] … provides subject-matter for error *if it is in fact true* (*si verum sit*) that cold is an absence and does not have as much reality as heat. For if I consider the ideas of cold and heat just as I received them from my senses, I am unable to tell that one idea represents more reality to me than the other.[10]

The reason why Descartes, among the many sensible properties he could take as a case-study for his argument, picked specifically coldness has arguably to do with Aristotelian philosophy, which took the contrastive pair hot-cold as physically fundamental. Accordingly, had Descartes succeeded in making his case about them, the entire natural philosophy of the Schools would have been overthrown.[11] In making clear to which class of ideas the problem of material falsity applies, Descartes did indeed list nothing but "hot and cold" as for the proper sensibles of touch, these being for the Aristotelian-minded thinkers of the time the prime objects of this sense-modality. Descartes' decision to exemplify his argument by discussing nothing but the idea of cold could therefore be explained as an argument *a fortiori*, even though it is hard to understand how the difficulties raised by Descartes about the idea of coldness (which have mostly to do with the issue of cold being a privative property) would apply to all sensory ideas.

There might indeed be a more specific and contingent reason for Descartes to take the idea of cold as a paradigmatic instance of ideas which could turn out to be "materially false". In the

[10] *Responsiones* IV; AT VII 232, 23 - 233, 2; CSM II 163.

[11] It must be pointed out that around Descartes' time there was in fact an increasing tendency to treat the other contrastive pair of physical and hence sensible qualities that Aristotle had taken to be fundamental – dryness-wetness – as somehow reducible to the hotness-coldness one, Telesio being the most obvious case in point.

1620s and '30s European scientists were indeed harshly debating about the nature of hotness and coldness, a debate to which also Mersenne participated with his usual enthusiasm for intellectual disputes. Without any doubt the man in charge of supervising the 1641 edition of the *Meditations* and the circle of thinkers and science practitioners gathering around him could immediately read between the lines of the *Third* what Descartes was alluding at, not even too obliquely. In this section of the *Third Meditation* Descartes seems indeed to be first and foremost addressing the readers conversant with the on-going debate about the *ontological status* of hotness and coldness, calling their attention to the fact that no like debate has ever been raised around shape and like properties. The simple fact the issue was under question, Descartes intimates, would indeed suffice to show that our *ideas* of heat and cold (as opposed to our ideas of geometrical figures) do provide no perspicuous insight into the bodies' properties they are about.

Descartes' point in calling the ideas of hot and cold "materially false" is indeed only that these ideas *could* give rise to error, insofar as they represent things *as other than they are* – and, more specifically, as *phenomenologically opposite* – what could turn out in actual fact to differ only *in degree*, as it would be the case for a faster of slower motion of the corpuscles.[12] A reader of *Essais* working in the Aristotelian tradition immediately denounced Descartes' claim as a plain "paradox", "as if the difference [between hot and cold] only consisted in a [difference in] local motion, and not in the *qualities* which differently affect the sense of touch!"[13] Fromondus had arguably in mind Aristotle's objection to the atomist theory of perception (whose influence on

[12] Although it is impossible to enter here the topic, it must be noticed that the difficulty of accounting for phenomenologically opposite sensations through physical properties were no opposition was to be found had already been intended by Aristotle as a key objection against atomist theories of perception (and objection that would equally apply if Democritus' atoms are replaced by Descartes' corpuscles); cf. *De sensu* , 442^{b}11-22. "For he [Democritus] says that white and black are rough and smooth respectively… All sensible objects exhibit contrariety, e.g., that of white to black in colors, or bitter and sweet in flavors. But no figure appears contrary to any other: to what polygon is a sphere contrary?". Descartes intended to solve the difficulty by appealing to "institution of nature" relating the passage from physiological stimuli to sensory ideas (see §25). Stimuli differing only in degree could accordingly be converted into phenomenologically opposite sensory ideas, as long as this opposition is still an isomorphic representation of the differences among the different degrees of particles motion (the phenomenological opposition does indeed enhance a difference that is already there, although is a less noticeable form – which, being less noticeable, would also be less conductive to the embodied mind's welfare).

[13] Fromondus to Plempius, 13 September 1637; AT I 407: "Quam etiam paradoxum quod pag. 162 ait, eadem corpuscula, si languide impellant sensum tactus, gignere frigoris sensationem, & caloris, si fortius impellant! Quasi vero tantum differentiae sit in illo impulsu locali, non in qualitatibus ipsis diversimode afficientibus organum tactus!" (emphasis added).

Descartes is patent, and made explicit by Fromondus): "Democritus says that white and black are rough and smooth respectively… All sensible objects exhibit contrariety, e.g., that of white to black in colors, or bitter and sweet in flavors. But no figure appears contrary to any other: to what polygon is a sphere contrary?"[14] By the same token, contested Fromondus, the causes of hot and cold must be genuinely opposite. Descartes, however, objected that there are indeed instances of phenomenologically opposite sensations whose causes differ in fact only as a matter of degrees, this being the case with pain and tickling (the perception of which was attributed by Descartes to touch). Whereas a gentle rubbing makes the perceiver smiles with pleasure, a hard one can in fact bring him to tears:

> What I say on page 162 – that a slow motion produces the sensation of cold, and a fast motion the sensation of heat – seems paradoxical to him [Fromondus]. On the same showing, it should also seem paradoxical to him that a gentle rubbing on the hand should produce a sensation of titillation and pleasure, and a harder rubbing produce a sensation of pain: for pleasure and pain are no less different from each other than heat and cold.[15]

Descartes in the *Meditations* is not arguing for this claim, which (as shown in the next chapters) is ultimately grounded on the physiology of the nervous system, and exceeds therefore the scope of a treatise "on first philosophy". Descartes wanted however to call his readers' attention to the argument raised by the philosophers of the time (most notably of all, Bacon), who had claimed that in actual fact the idea of cold results from nothing but from depriving the corpuscles of a body of their motions, whose swift movements would bring about the idea of hot. The simple fact that there were arguments of this kind (whereas on the other hand no one had ever contested that bodies are extended and have a shape) was for Descartes enough to attest that sensory ideas are not so clear about what they represent. In Scholastic parlance, Descartes claimed that it could indeed turn out to the case (as he intended in his natural philosophy to prove that it was) that what the idea of cold represents as on a par with hotness is *de facto* a mere *privation* thereof:

> The ideas which I have of heat and cold contain so little clarity and distinctness that they *do not enable me to figure out* whether cold is merely the absence of heat or vice versa, or whether both of them are real qualities, or neither is. And since there can be no ideas which are not as it were of things, *if it is true* that

[14] *De sensu*, 442[b]11-22.

[15] To Plempius, 3 October 1637; AT I 424; K 66*. See also *Dioptrique* VI; AT VI 131. *Monde* II; AT XI 10.

> cold is nothing but the absence of heat, the idea which represents it to me as something real and positive deserves to be called false; and the same goes for other ideas of this kind.[16]

As the passage makes clear, though, if this was the case the idea of hot could not thereby be said to be "materially false": contrary to what happens with the idea of cold, this idea would in fact represent as a positive quality of a body something which is indeed something *positive* in a body, rather than a mere privation of its opposite. In his discussion of material falsity Descartes does in fact never mention the issue of similarity, nor does he seem to be making the point that *all* ideas are materially false insofar as they represent their objects as other than they are. Descartes' claim turns to be a quite more general and weaker one, namely, that the ideas of sensory qualities cannot be taken right away to provide a transparent insight into the essence of the bodies they are about, as the case of cold is intended to show. As already explained in §11, according to Descartes sensory ideas are indeed *epistemologically opaque*, opaque to the point of not being even able to prove themselves wrong:

> I think of these [the proper sensibles] only in a very confused and obscure way, *to the extent that I do not even know whether they are true or false*, that is, whether the ideas I have of them are ideas of real things or of non-things.[17]
>
> My only reason for calling the idea 'materially false' is that, owing to the fact that it is obscure and confused, *I am unable to judge* (*non possim dijudicare*) whether or not what it represents to me is something positive which exists outside of my sensation.[18]

This thesis is as a matter of fact much more general than the concept of material falsity, to that it could survive virtually unchanged in the *Principles*, where Descartes no longer mentions the concept of a falsity other than the "formal" (most likely as a result of Arnauld's difficulties):

> In order to distinguish what is clear… from what is obscure, we must be very careful to note that pain and color and so on are clearly and distinctly perceived when they are regarded merely as sensations, or thoughts. But when they are judged to be real things outside our mind, there is no way of understanding

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[16] *Meditationes* III; AT VII 43, 31 - 44, 8; CSM II 29*: "Ita, exempli causa, ideæ quas habeo caloris et frigoris, tam parum claræ & distinctæ sunt, ut *ab iis discere non possim*, an frigus sit tantùm privatio caloris, vel calor privatio frigoris, vel utrumque sit realis qualitas, vel neutrum. Et quia nullæ ideæ nisi tanquam rerum esse possunt, *siquidem verum sit* frigus nihil aliud esse quàm privationem caloris, idea quæ mihi illud tanquam reale quid & positivum repræsentat, non immerito falsa dicetur, & sic de cæteris" (emphases added).

[17] *Ibid.* AT VII 43, 23-26; CSM II 29* (emphasis added).

[18] *Responsiones* IV; AT VII 13-17; CSM II 164.

> what sort of things they are. If someone says he sees color in a body or feels pain in a limb, this amount to say that he sees or feels something there whose nature is completely unknown to him (*quod quidnam sit planè ignorat*). Or, in other words, that he does not know what he is seeing or feeling. Admittedly, if he fails to pay sufficient attention, he might easily convince himself that he has some knowledge of what he sees or feels, because he may suppose that there is something similar to the sensation of color or pain which he experiences within himself. But if he examines the nature of what is represented by the sensation of color or pain – what is represented as existing in the colored object or the painful part – he will realize that he is wholly ignorant of it (*omnino advertere se id ignorare*).[19]

Coming back to the problem of material falsity, and on a more general level, it is crucial to notice that Descartes could not claim that *all* sensory ideas are false simply on the account of being sensed – i.e. of being sensory ideas. According to Descartes also shape and the like are indeed *sensed* (besides being grasped by the pure intellect and imagined). As already made clear in the first part of the present work, "sensory ideas" has been taken to refer first and foremost to the ideas – like colors-ideas and the ideas of all remaining proper sensibles – which do *stem from* the senses and are accordingly apprehended by the upper faculties of the mind (imagination, and the understanding) only in a derivative way.[20] Shape and the like too, still, are sensed, although the mind can as well apprehend them through the intellect (and, hence, the imagination). This means, though, that if being sensed would be enough for a quality to be denied to a body, then also shape and the like should be stripped from material substances, contrary to Descartes' intention. Since Descartes took to have proven that bodies are shaped from the (innate) intellectual idea of shape, it represents for him no problem that, by considering nothing but the *sensory* idea of shape, it could not be established whether bodies are shaped or not, on this regard shape being on a par with color. Color *qua* sensed (and color cannot be but sensed, at least originally) and shape *qua* sensed are indeed perfectly on a par, so that denying *a priori* the former to bodies would result in denying *a priori* the latter. The reason why we do have a "clear and distinct" ideas of shape is not indeed for Descartes that they are *sensed in a different*

[19] *Principia* I 68; AT VIII-1 33, 8-25; CSM I 217* (the passage was already discussed in §11).

[20] As already make clear in §§5-8, according to Descartes these sensibles can also be imagined, but they still differ from shape and like notions insofar as the imaginings of the former derive from the senses and not from innate intellectual notions, as Descartes argued to be the case for the latter. Analogously, Descartes admits the existence of color-concepts, but he insisted that they derive from the senses rather than being inborn to the mind (so that a blind man, lacking the appropriate physiological stimulus, would accordingly be unable to form them). Descartes' crucial point is indeed first and foremost that these different classes of ideas have different *origins* (either from the understanding, or from the senses).

way, but that that shape is *not only sensed*, but also intellectually grasped.[21] Although Descartes appealed to the received distinction between proper and common sensibles (as already pointed out in §§5-8), this plays in fact no foundational role in Descartes' mature philosophy. The reason why Descartes ascribed shapes to bodies is *not* in fact that shape (contrary to what happens to be the case with colors) is both *seen and touched*, but because shape (contrary to what happens to be the case with colors) is both *sensed and understood by the pure intellect*. By the same token, the reason why Descartes ended up denying colors and similar features to bodies was *not* that like features are sensed. As remarked in §11, the point is rather that the non-intellectual origin of sensory ideas made them so opaque to the understanding that the cognizer cannot even determine whether they were true of false, that is – according to Descartes' own understanding of these notion in the issue at stake – whether like ideas represented their objects as they actually are, or not:

> From the fact that I sense very different colors, sounds, smells, flavors, hot, hardness and the like, I am correct in inferring that in the bodies which are the source of these various sense-perceptions there are some corresponding, though *perhaps* non-similar, differences.[22]

"Perhaps" (*forte*): is this the final word of the *Meditations* concerning whether bodies are nothing but extended things, or not. Descartes' intention in the *Third Meditation* was indeed only to warn the reader not to take sensory ideas at face value – i.e. not to assume them to represent their object precisely as they are, as if this could go without saying – without presenting any decisive piece of reasoning in favor of this claim (if not an oblique reference to the contemporary debate around the concepts of hot and cold). Accordingly, in the *Synopsis* introducing the work and outlining the structure of its argument, the *Third Meditation* is not ever mentioned as it comes to explain where exactly the "distinct concept of corporeal nature" would have been established. Although crucial to make sense of Descartes' understanding of the problem of representation in general, the concept of material falsity cannot therefore be taken to establish the intended conclusion of Descartes' metaphysics of bodies. As Descartes pointed out again in his replies to Arnauld, it remained in fact still to be determined whether it is actually true (*si verum sit*) that the "obscure and confused" ideas of the senses are false in the afore-mentioned sense.[23]

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[21] The topic will be addressed more in detail while discussing Descartes' theory of a "natural geometry" of vision; cf. §27.

[22] *Meditationes* VI; AT VII 81, 17-22; CSM II 56*: "Et certe, ex eo quod valde diversos sentiam colores, sonos, odores, sapores, calorem, duritiem, & similia, recte concludo, aliquas esse in corporibus, a quibus variæ istæ sensuum perceptiones adveniunt, varietates iis respondentes, etiamsi forte iis non similes".

[23] In addition to the already-quoted *Responsiones* IV; AT VII 232, 24-25, see *Ibid.* 234, 4-5.

"Perhaps". Whether material substances are nothing but *res extensæ* is indeed something that Descartes took himself to have *not* established in his *Meditations on First Philosophy*.

The case of material falsity just considered permits thus to ascertain once and for all that, despite subscribing to a "rule of truth", Descartes has never taken advantage of something like a "rule of falsity" or kindred kinds of principles and arguments *e silentio* to support his claims. That "whatever is clearly and distinctly perceived is true" does not indeed entail that what is *not* perceived in like a manner is *not* true, but only that "obscure and confused ideas" are *not necessarily* true, so that they *could* in fact turn out to be false. Descartes has indeed insisted over and over again that one should be careful to draw conclusions only from what he knows, never from what he ignores or cannot fully grasp. Our being unable to figure out whether the ideas of hot and cold misrepresent their objects (or, to anticipate the topic of §17, how the interaction between two heterogeneous substances works) had indeed for Descartes more to say about the finitude of our mind than the actual structure of the world. Descartes' bold statements in the most abstruse domains of knowledge had indeed made people forget, or fail to notice, that the goal he had first set for himself as a philosopher was to determine the nature of human cognition in order to "determine the *limits* of man's cognitive power", arguing that "the most worthwhile question to be asked concerns indeed the essence and *scope* of human knowledge" (*vero nihil hic utilius quæri potest, quàm quid sit humana cognitio & quousque extendatur*).[24] This is for Descartes the "first of all questions", to which anyone "with the slightest affection for truth" (*qui tantillùm amant veritatem*) is called to answer once in his life. Before puzzling over the *arcana naturæ* or cerebrate over "the influence of heavens on these lower regions", Descartes argued that it was indeed to be enquired whether human reason is capable at all of coming to know the truth about these subjects (*utrùm ad illa invenienda humana ratio sufficiat*).[25] It was by pursuing this enquiry that Descartes arrived to the rule of truth, and to realize at the same time that this rule does *not* entail that what is *not* perceived in a clear and distinct way is to be discarded, simply because of that, as false. If it was not for René's annoying self-conceit, one could indeed be tempted to attribute to Descartes a virtue he had always claimed to have and that is usually ascribed one of his major late-to-be opponent: some *theoretical modesty* or, at least, the cardinal philosophical virtue never to take the absence of an argument for an argument in its own right. The reading just presented of the "material falsity" argument is indeed not only of interest for Descartes' theory of bodies, but casts light on Descartes' more general approach to philosophical questions and on an argumentative method at work in the most disparate domains.

[24] *Regulæ* VIII; AT X 398, 12 & 397, 27-28; CSM I 31* (emphases added).

[25] *Ibid.* AT X 398, 1-10; CSM I 31*.

Besides the case of "material falsity", Descartes' theoretical modesty and argumentative circumspection emerge indeed with especial evidence from his insistence that the *Meditations* do *not* establish the soul's immortality, despite Mersenne's urgent insistence to draw the blessed conclusion. Without a doubt Descartes would have been more than happy to prove this piece of truth: its demonstration (thought Mersenne with good reasons) would have immensely helped to obtain the *privilegium & approbationem* of the Sorbonne theology faculty, to which the text had been submitted for review. Mersenne, driven by his zeal as an editor and as a priest, went so far as to modify the sub-title of the *Meditations*, which in the Paris 1641 edition are said to prove the soul's *immortality*, notwithstanding Descartes' cautious remarks (in a letter directed precisely to Mersenne, as the man in charge of the edition), to modify the title of the *Second Meditation* so to make sure that readers could not been led astray even for a second that this had been his actual intention.[26] To Mersenne's eyes, Descartes has likely to have already demonstrated the soul's immortality: in his *Quæstiones in Genesim* (1623) Mersenne had indeed already listed no less than sixty (yes, sixty) arguments for this conclusion.[27] Descartes, on this part, opens nonetheless the *Meditations* by firmly opposing Mersenne's strategy – although passing over his name in silence – arguing for the policy 'less is more':

> the present treatise contains everything that I have been able to accomplish in this area. Not that I have attempted to collect here all the different arguments that could be put forward to establish the same results, for this does not seem worthwhile except in cases *where no single argument is regarded as sufficiently reliable*.[28]

The point, though, was precisely that for Descartes a decisive argument for the soul's immortality was nowhere to be found, and this was indeed the reasons why like an argument had not been presented in the *Meditations*, where he said to have put forward only "very certain and evident demonstrations" of the best kind, adding (with his well-known understatement) "that these proofs are of such a kind that he reckoned they leave no room for the possibility

[26] Cf. To Mersenne, 28 January 1641; AT III 297: "Ce qui me fait penser qu'au titre de la seconde Méditation, *de Mente humana*, on peut ajouter, *quod ipsa sit notior quam corpus*, afin qu'on ne croie pas que j'aie voulu y prouver son immortalité".

[27] On Mersenne's demonstration of the soul's immorality, see C. F. Fowler, Descartes on the Human Soul: *Philosophy and the Demands of Christian Doctrine* (Dordrecht: Kluwer 1999), 194.

[28] *Meditationes*, *Synopsis*; AT VII 4, 1-8; CSM II 4 (emphasis added).

that the human mind will ever discover better ones".[29] "I have tried not to put down anything which I could not precisely demonstrate", he insisted once again to explain why he did not positively assert the soul's immortality as most of his readers would have loved him to do, and which Descartes too would have been more than happy to list among the achievements of his philosophy.[30]

According to Descartes, what philosophy can prove – and, accordingly, what one could expect the *Meditations* to prove – is indeed only that "the decay of the body does not imply the destruction of the mind".[31] If it is unjustified to infer the annihilation of the mind from the body's decay, Descartes warned that it would in fact also be unwarranted to assert that the disembodied mind assuredly keeps on existing, since we do have no positive insight into this alleged piece of truth. God, by way of instance, could indeed let souls go out of existence as soon as the body they are attached to ceases to be suitable to host a mind. As far as the first question is concerned, Descartes thought that philosophy is indeed completely in the dark:

> You [the addressee is once again Mersenne and his Circle] go on to say that "it does not follow from the fact that the soul is distinct from the body that it is immortal, since it could still be claimed that God gave it such a nature that its duration comes to an end simultaneously with the end of the body's life". Here I admit that I cannot refute what you say. For I do not take it upon myself to try to use the power of human reason to settle any of those matters which depend on the free will of God. Our natural knowledge tells us that the mind is distinct from the body, and that it is a substance. But in the case of the human body, the difference between it and other bodies consists merely in the arrangement of the limbs and other accidents of this sort; and the final death of the body depends solely on a division or change of shape. Now we have no convincing evidence or precedent (*nullum habemus argumentum, nec exemplum*) to suggest that the death or annihilation of a substance like the mind must result from such a trivial cause as a change in shape, for this is simply a mode, and what is more not a mode of the mind, but a mode of the body which is really distinct from the mind. Indeed, we do not even have any convincing evidence or precedent to suggest that any substance can perish. And this entitles us to conclude that the mind, in so far as it can be known by natural philosophy, is immortal. But if your question concerns the absolute power of God, and you are asking whether he may have decreed that human souls cease to exist precisely when the bodies which he joined to them are destroyed, then it is

[29] *Ibid.* AT VII 4, 8-10; CSM II 4*: "Addamque etiam tales esse, ut non putem ullam viam humano ingenio patere, per quam meliores inveniri unquam possint".

[30] *Ibid,* AT VII 12, 16 - 13, 5; CSM II 9.

[31] *Ibid.* AT VII 13, 12-27; CSM II 10.

for God alone to give the answer (*solius est Dei respondere*). And since God himself has revealed to us that this will not occur, there remains not even the slightest room for doubt on this point.[32]

By the same token, in a letter of the mid-1640s Descartes conceded that "it is true… that knowledge of the immortality of the soul, and of the felicity of which it will be capable after this life, might give occasion to those who are tired of this life to leave it, if they were certain that they would afterwards enjoy all that felicity". But, as he hastened to add "no reason guarantees this" (*mais aucune raison ne les en assure*).[33] The *Meditations* argument could only "give mortals the hope" in after-life, which Christian Revelation prescribed to all believers as a matter of faith.[34] The specific case of the soul's immortality aside, Descartes' general point is clear, and fully consistent with what has been shown so far: the absence of any arguments against a claim is not a sufficient reason in its favor, for how much this claim would be welcomed. By the same token, the absence of any argument in favor of a claim does not imply by itself that the claim is *false*, but only that *there are no reasons to endorse it*, so that it would be unjustified to claim it true.

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[32] *Responsiones* II; AT VII 153, 4 - 154, 8; CSM II 108-109*. Descartes sometimes claimed to have demonstrated the soul's immortality without further qualifications, as for example in a side remark of this reply To Hyperaspistes, August 1641; AT III 422: "ex eo quod compositum humanum sit ex naturâ suâ corruptibile, mens autem incorruptibilis & immortalis". Cf. To Regius, January 1642; AT III 503: "& naturæ differentia viam aperit facillimam ad ejus immaterialitatem immortalitatemque demonstrandam, ut in *Meditationibus de primâ Philosophiâ* nuper editis videri potest". In a letter of approximately the same time Descartes is however careful in distinguishing between the two points, as always when addressing the issue thematically; cf. To Mersenne, 24 December 1640; AT III 265-66; K 164-65: "You should not be surprised. I could not prove that God could not annihilate the soul, but only that it is by nature entirely distinct from the body, and consequently it is not bound by nature to die with it. This is all that is required as a foundation for religion, and is all that I had any intention of proving". Side remarks like the ones mentioned-above are thus to be dismissed as hasty.

[33] To Elisabeth, 6 October 1645; AT IV 314-15; K 272.

[34] As far as pure philosophy is concerned, Descartes pointed out nonetheless that the "the premises which lead to the conclusion that the soul is immortal depend on an account of the whole of physics", and despite listing them in the *Synopsis*, the sub-title of the 1642 Amsterdam edition of the *Meditations* read "in which it is established the real *distinction* of the human mind from the body" – and nothing more than that (*Meditations*, *Synopsis*; AT VII 13, 28 - 14, 17; CSM II 10). Even in the 1647 preface to the French *Principles* Descartes makes clear that in the treatise it will be established the soul's immateriality, without yet mentioning its alleged immortality: "la vraie philosophie, dont la première partie est la métaphysique, qui contient les principes de la connaissance, entre lesquels est l'explication des principaux attributs de Dieu, de *l'immatérialité de nos âmes,* et de toutes les notions claires et simples qui sont en nous" (AT IX-2 14; emphasis added). In the *Search after Truth* Descartes claims that he will deal with "l'immortalité des créatures", but in the extant part of the work (most probably never accomplished) the issues never surfaces again; cf. *Recherche de la vérité*; AT X 506.

Descartes has indeed a general tendency to get content with establishing negative claims and a keen understanding that the proof of some claim could not be simply inferred from the negation of the negation, but requires an argument of its own. According to these principles, Descartes took himself to have established that the mind *does not die* with the body (but not that the mind *survives* to it) and – to anticipate the main point of the chapters to come – that *we do not need to posit animal souls* or real qualities (but not that *there exist none* in nature):

> I regarded it as certain and established that we can prove by no means the presence of a thinking soul in animals (*pro certo ac demonstrato habui*, *nullo pacto a nobis probari posse, aliquam esse in brutis animam cogitantem*) ... But though I regard it as established that we cannot prove there is any thought in animals, I do not think it is thereby proved that there is not, since the human mind does not reach into their hearts (*mens humana illarum corda non pervadit*).[35]

As the next section show Descartes though that there were indeed no *a priori* arguments to rule out non-human animals' minds, real qualities, and substantial forms. Descartes' claim that bodies are nothing but extended substances turns out in fact to be a more modest – but, according to Descartes, not less effective – argument: an argument for the best explanation grounded on the principle of metaphysical parsimony. Or, to put it more roughly, a razor.

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[35] To More, 5 February 1649; AT V 276; K III 365. Although the point is too intricate to be adequately addressed here, Descartes' claim that only God can be said to be positively *infinite* whereas the material world would be nothing but *indefinite* seems to stem from the same philosophical caution. Scholars have often attached Descartes for drawing a meaningless distinction driven by theological concerns; see especially Alexandre Koyré, *From the Closed World to the Infinite Universe* (Baltimore: Johns Hopkins Press 1957). Without trying to adjudicate of the distinction itself, Descartes' insistence that between being positively perceived to be *infinite* and being positively perceived to be *non-finite* there is quite of a difference seems yet to be genuinely philosophical in nature, and firmly grounded on Descartes' general claim that metaphysical issues must be settled in the light of what he know about them. For Descartes, we do indeed know in very different ways that God and the material world are not finite, an asymmetry which he captured by distinguishing between infinite and indefinite beings. Cf. *Principia* I 27; AT VIII-1 15, 18-25; CSM I 202: "Our reason for using 'indefinite' rather than 'infinite' in these cases [in the case of "the extension of the world, the division of the parts of matter, the number of the stars, and so on"] is, in the first place, so as to reserve the term 'infinite' to God alone. For in the case of God alone, not only we do not fail to recognize any limits in any respect, but our understanding positively tells us that there are none (*non modo nullos limites agnoscimus, sed etiam positivè nullos esse intelligimus*). Secondly, in the case of things other than God, our understanding does not in the same way positively tells us that they lack limits in some respect. We merely acknowledge in a negative way that any limits which they may have cannot be discovered by us (*non eodem modo positivè intelligimus alias res aliquâ ex parte limitibus carere, sed negativè tantùm earum limites, si quos habeant, inveniri à nobis non posse confitemur*)". See also To Clerselier, 19 April 1649; AT V 356.

[§§16-17] Metaphysical Arguments

The so-called "separability test" and the concept of a material falsity of sensory ideas presented in the *Third Meditation* have proven unable to establish Descartes' claim that bodies are nothing but extended substances. Whether sensory ideas are similar or not to the physical properties they represent remains indeed still to be decided. While the (purported) arguments just mentioned considered nothing but the *ideas* of bodies and the conceptual relations between them, scholars have also argued that Descartes thought he had devised at least two purely *metaphysical* arguments in favor of the claim that bodies are nothing but extended substances. One it is said be based on a constraint on the causal process – the so-called "Causal Likeness Principle"– which would rule out *a priori* that the brain states that give rise to sense-perceptions could have been brought about by the "real qualities" posited by Scholastics in bodies to account for the perceptual process. The other alleged argument would on the other hand refute the very notion of a "real quality" on the basis of Descartes' theory of modes and substance, thereby immediately excluding any like non-corporeal entities from the physical world. Descartes' metaphysics would accordingly succeed where his phenomenology had failed. Or, at least, so it is claimed.

§16. Causal (un)likeness

Descartes claimed on the basis of his studies in physiology that the physiological stimuli that give rise to sense-perceptions are ultimately to be understood as modification of the sense-organs' shape – both the external and the internal ones – or, more precisely, as *pattern of motions* travelling from the external sense-organs to the brain via the nerves (§24 is almost exclusively devoted to articulating this point, which for the time being can only be *assumed*). The problem Descartes intended to answer was which kind of properties in bodies had brought about these patterns of motion in the very first place: some "real qualities" such as "hotness" and "redness" as argued by the Scholastics, or just certain configurations of the bodies' particles?

Cottingham has famously argued that Descartes' metaphysics excluded right away the former option since, so states Cottingham, Descartes subscribed to the "Causal Likeness Principle", according to which a cause and its effect must be similar in kind:

> "Nothing in the effect which was not in the cause" is a fundamental principle that Descartes claims in the *Third Meditation* to be manifest by the natural light (AT VII 40; CSM II 28). This suggests that there must be, for Descartes, some similarity between cause and effect – an interpretation supported by Descartes's reported allegiance to the sweeping and general maxim that "the effect is like the cause" (AT V 156; CSMK 339-40).[1]

A material and a non-material entity (as is the case for a pattern of motion travelling the nerves and the "qualities" of the Aristotelians) belong however to distinct ontological categories, this being the main thrust of Descartes' dualism. Accordingly, a "real quality" could never set up a motion like the one that made the perceiver to apprehend a certain color. Therefore, Cottingham argued, the ultimate cause of sense-perception must belong to the same category of the brain-stimulus which acts as the proximate cause of a certain sensation. And thus, Cottingham concludes, an object can be said to be red only inasmuch as the configurations of its particles bring about a sensation of red in the perceiver. No *rubedo* and like qualities would however to be found in bodies, since entities of this sort could not causally interact with the perceiver's body. Taking their cue from Cottingham, other scholars have argued that this same ontological principle would in fact also rule out any causal interaction between the *res cogitans* and the *res extensa*. Accordingly, the "Causal Likeness Principle" would not only establish tht bodies are nothing but extended things, but also that Descartes was an Occasionalist, at least of sorts. For how much Radner, Broughton and Nadler (just to name a few proponents of this reading) might differ about the specifics of their account, they all agree indeed that Descartes's philosophy firmly excluded that two completely heterogeneous substances like mind and body could causally interact.[2]

The problem with Cottingham's quite influential interpretation is that is not supported by the texts. What Descartes meant in the passage from the *Third Meditation* quoted by Cottingham is indeed only that the *degree of reality* of the effect cannot exceed the degree of reality of its

[1] John Cottingham, "Descartes on Colour" in Id., *Cartesian Reflections: Essays on Descartes' Philosophy* (Oxford: Oxford University Press 2008), 152; originally in *Proceedings of the Aristotelian Society* 90 (1989-90): 231-46. But see already Kenneth Clatterbaugh, "Descartes' Causal Likeness Principle" *Philosophical Review*, 89/3 (1980): 379-402.

[2] Daisie Radner, "Is There a Problem of Cartesian Interaction?", *Journal of the History of Philosophy* 23 (1985): 35-49. Janet Broughton, "Adequate Causes and Natural Change in Descartes' Philosophy" in Alan Donagan – Anthony N. Perovich – Michael V. Wedin eds., *Human Nature and Natural Knowledge: Essays Presented to Marjorie Grene on the Occasions of Her Seventy-Fifth Birthday* (Dordrecht: Reidel 1986): 107-27. Steven Nadler, "Descartes and Occasional Causation", *British Journal for the History of Philosophy* 2 (1994): 35-54.

(total) cause since otherwise – claims Descartes – it would be contradicted a principle that Descartes took to be known to be true "by natural light". The principle, namely, that *ex nihilo nihil fit*:

> Now it is manifest by the natural light that there must be at least as much <reality> in the efficient and total cause as in the effect of that cause. For where, I ask, could the effect get its reality from, if not from the cause? And how can the effect give it to the effect unless it possessed it? It follows from this both that something cannot arise from nothing, and also that what is more perfect – that is, contains in itself more reality – cannot arise from what is less perfect.[3]

This claim preludes to Descartes' demonstration of God's existence based on the idea we would have of this supremely perfect being. Descartes argued in fact that also ideas taken *objectively* require at bottom level a formal cause to account for their "degree of reality", so that the idea of the supremely perfect being would require for Descartes no less than the supremely perfect being as its cause. Cottingham himself pointed out that some scholars before him (Loeb, and Richardson) have indeed interpreted the passage from the *Third Meditation* as making a claim about nothing but the degree of reality of the effect as compared to the degree of reality of the cause, rather than about the ontological similarity (whatever this could be taken to mean) between cause and effect.[4] It should indeed be noticed that Descartes himself explicitly broadened the original scope of his claim to make it hold between beings of different sorts – the ones which exist "formally" and the ones which exist "objectively", namely – which according to Descartes differ nonetheless between themselves more than any two "formally" existing beings could ever do.[5] Cottingham rejected this reading arguing that in other occasions Descartes "employs *metaphors* that strongly suggest that causal transactions must be a matter of

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[3] *Meditationes* III; AT VII 40, 21 - 41, 1; CSM II 28: "Jam verò lumine naturali manifestum est tantumdem ad minimum esse debere in causa efficiente & totali, quantum in ejusdem causæ effectu. Nam, quæso, undenam posset assumere realitatem suam effectus, nisi a causa? & quomodo illam ei causa dare posset, nisi etiam haberet? Hinc autem sequitur, nec posse aliquid a nihilo fieri, nec etiam id quod magis perfectum est, hoc est quod plus realitatis in se continet ab eo quod minus". The translation comes as usual from Cottingham's own edition. A version of Cottingham's "Causal Likeness Principles" had already been subscribed also by Richard A. Watson, *The Downfall of Cartesianism: 1673-1712: A Study of the Epistemological Issues in late 17th Century Cartesianism* (The Hague: Nijhoff 1966).

[4] Cf. Louis E. Loeb, *From Descartes to Hume: Continental Metaphysics and the Development of Modern Philosophy* (Ithaca, NY: Cornell University Press 1981). Robert Richardson, "The "Scandal" of Cartesian Interactionism", *Mind* 91 (1982): 20-37.

[5] On the concept of formal and objective reality, see §0.

bestowing or handing on of features from cause to effect".[6] Cottingham, as a matter of fact, comes to favor these metaphors over Descartes' express and decisive statement that "is false and cannot in any way be proven that if the soul and the body are two different substances with diverse natures, this prevents them from being able to act on each other".[7]

As shown in detail by Schmaltz, Descartes has never ruled out the *possibility* of a causal interaction between mind and body (as clearly attested by the passage just quoted against Gassendi). The mind-body interaction, according to Descartes, makes clear that the interaction between corporeal and non-corporeal substances is indeed not only non-contradictory, but also real in at least one case (at least two, by considering God's constant action on the world). Schmaltz has compellingly argued that Descartes never subscribed to any "Causal Likeness Principle" along Cottingham's lines, but only to what he calls the "Containment Principle" governing the relation between the degrees of reality of the cause and the effect, clearly stated in the *Third Meditation* and in many other of Descartes' works.[8] As rightly pointed out by Schmaltz, "without the assumption that sensory ideas have an objective reality that requires a cause, this argument [the *Sixth Meditation* argument that external bodies exist, already studied in §2 and §9] could not even get off the ground", thereby proving a decisive theoretical argument – besides the many textual ones – against any reading *à la* Cottingham.[9] As shown in §25 while considering Descartes' theory of the "institution of nature" that governs the relation between brain and mental states, Descartes thought that the real challenge to this theory of perception (sense-perception being the chief instance of body-mind causation) had not in fact to do with the "Heterogeneity Problem" denounced by most of the scholars mentioned above, but with

[6] John Cottingham, "Descartes on Colour", 152 (emphasis added). Cottingham also couches his argument in epistemological terms, arguing that "nothing can be explained by attributing to objects a real quality of redness, for such a quality is uncapable of figuring in a causal explanation of how our senses are affected by those objects"; *Ibid.* 154. The interaction between a corporeal and a non-corporeal entity is admittedly according to Descartes unintelligible to us, but this unintelligibility cannot be taken as a piece of evidence about the possibility and hence the existence of like an interaction. As the next chapter (§17) is intended to show, if this were the case also Descartes' theory of the mind-body union would in fact have to be refuted, as Descartes himself perfectly realized.

[7] To Clerselier, 12 January 1646; AT IX-1 213; CSM II 275.

[8] Tad Schmaltz, *Descartes on Causation* (Oxford University Press: Oxford 2008). But see already Robert Richardson and Louis Loeb, "Replies to Daisie Radner's "Is There a Problem of Cartesian Interaction?"", *Journal of the History of Philosophy* 23 (1985): 221-31. Daisie Radner, "Rejoinder to Professors Richardson and Loeb", *Journal of the History of Philosophy* 23 (1985): 232-36.

[9] Schmaltz, *Descartes on Causation* 66.

what Rozemond has aptly called the "Dissimilarity Problem".[10] But that such a dissimilarity between mental and brain state and, hence, between mental states and the corresponding properties of objects was there at all, was according to Descartes something that had still to be established at that stage of the enquiry, and could be *deduced* from the metaphysics of causation alone. Cottingham himself, in order to have his argument started, had indeed to assume a good deal of Descartes' physiology of the perceptual process. Not yet enough, though, since otherwise he would have probably realized that the solution to the interpretative problem he was trying to solve comes precisely from Descartes' account of the perceptual process in general, and of the visual process specifically. Descartes' first alleged argument from metaphysics in favor of the claim that bodies are nothing but extended substances does not score indeed any better than its already refuted phenomenological companions.

[10] Marleen Rozemond, "Descartes on Mind-Body Interaction: What's the Problem?", *Journal of the History of Philosophy* 37 (1999): 435-67.

§17. Modes and real qualities

The final argument discussed in the literature for justifying Descartes' claim that bodies are nothing but extended substances revolves around Descartes' concept of mode and his consequent denial of the received notions of a 'real accident' and of a 'real quality' – where 'real' stands for 'separable' (more on this below). Since Schoolmen accounted for sensible qualities precisely in terms of *qualitates reales*, once refuted this notion sensory qualities such as colors would have immediately resulted to be out of place in bodies. Descartes, it is claimed, would therefore be in possession of a genuinely argument from first philosophy in favor of his metaphysics of bodies.

The clearest formulation of Descartes' theory of modes is to be found in the 1644 *Principles*, one of whose main purposes was precisely to discuss Descartes' own philosophy alongside the received metaphysical theories of the Schools, with the intention to disprove and hence supplant them. To introduce his notion of mode, Descartes starts by remarking that the things we are confronted with, ourselves included, present themselves with various features, and with different features at different times: in motion or at rest, bold or scared, with or without a certain shape, with or without a certain thought in mind. Descartes proceeds thence to argue that these features are not however on a par, nor, on a more general level, does one and same kind of relation hold between all of them. Whereas "it is possible to understand of extension without shape or movement and of thought without imagination or sensation", the reverse does not in fact hold true, since (as Descartes claims) we can indeed understand shape only as the shape *of* something extended, an unextended shape being plainly unconceivable to us.[1] Analogously for the case of imagining and sensing which, as explained in §5, Descartes claims to "include an intellection in their formal concept" (*intellectionem enim nonnullam in suo formali conceptu includunt*), as it would be impossible for us to conceive of something – or, better, of someone – who can imagine but has no thoughts.[2] By means of this enquiry into our notions, Descartes thus came to distinguish between two classes of ideas, the former being of features which presuppose extension, the latter listing "thought" in the corresponding place: the features we are presented with in our experience accordingly form *two* groups of notions, each of which can be understood independently of the other (a claim that launches Descartes' argument that mind and body are distinct, as already pointed out in the first part of the work).[3] Descartes speaks accordingly of

[1] *Principia* I 53; AT VIII-1 25, 22-28; CSM I 210-11*.

[2] *Meditationes* VI; AT VII 78, 21-18; CSM II 54*.

[3] Cf. *Principia* I 54; AT VIII-1 25, 28 - 26, 1.

"two ultimate classes of things" (*summa genera rerum*): on the one hand, "intelligent, or thinking things", on the other "material things".[4] Descartes, though, does not content himself with telling apart two classes of ideas and to describe how they are related to each other. The features we are presented with cannot indeed subsist free-floating by themselves for Descartes, but must inhere *in* something which would provide their metaphysical grounding.[5] Making use of a notion quite widespread among late Scholastics, Descartes refers to the above-mentioned 'features' as *modes*, where modes are to be understood as the modifications *of a substance*. Descartes make clear that he takes the term to mean the same as 'attribute' and 'quality', which would differ from the former only insofar as they would qualify different *aspects* of the metaphysical relation between a substance and its modifications (not a different *sort* of relations, though, as argued by many late Scholastics):

> By 'mode'… we understand exactly the same as what is elsewhere meant by 'attribute' and 'quality'. But when we regard the substance as being affected or *modified* by them, we call them 'modes'. When we regard them that these variations can *designate* a substance [as a "thinking" or as an "extended substance"], we speak of them as 'qualities'. Finally, when we are simply thinking in a more general way of them as being *in* a substance, we speak of them as 'attributes'.[6]

According to Descartes, the feature "presupposed" by all others in the two classes mentioned above (extension, respectively, and thought) is indeed to be taken as the one that *qualifies* the substance wherein all of them inhere as, respectively, the "extended" and as the "thinking" one. If both shape and extension are 'attributes' of a body (a finite body always being both shaped and extended), only extension counts for Descartes as the "principal attribute" of a body in virtue of its priority over all other modes.[7] This extension, according to Descartes, does not only 'qualify' or 'designate' this substance as the 'extended' substance, as if the issue at stake would just be a matter of semantics. What Descartes also calls the "principal property" (*præcipua proprietas*) of a substance is indeed to be taken as its *essence*:

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[4] *Principia* I 48; AT VIIII-1 23, 3-8; CSM I 108.

[5] Cf. *Principia* I 52, 8-11; CSM I 210: "If we perceive the presence of some attribute, we can infer that there must also be present an existing thing – or substance – to which it may be attributed".

[6] *Principia* I 56; AT VIII-1 26, 19-25; CSM I 211* (emphases added).

[7] The qualification for *finite* bodies is here crucial: it is indeed precisely because one can think of an indefinite body (a body which, having no boundaries, has therefore also no shape) that Descartes assigns priority to extension over shape. The point is especially clear from the exchange with Henry More.

To each substance there belong one principal attribute: in the case of mind, this is though; in the case of body, extension.

> A substance may indeed be known thought *any* attributes. But each substance has *one* principal property which constitutes its nature and essence, and to which all of its other properties are referred. Thus extension in length, breadth, and depth constitutes the nature of corporeal substances; and thought constitutes the nature of thinking substance. Everything else which can be attributed to a body presupposes extension, and is merely a mode of an extended thing; whatever we find in the mind is simply one of the various modes of thinking.[8]

Descartes would thus appear to have a decisive metaphysical argument for denying colors and like properties to extended things: since "everything which can be attributed to a body presupposes extension" (*omne aliud quod corpori tribui potest, extensionem præsupponit*), and since Descartes denies that this is the case for properties like colors, he could and had therefore to throw these features out of the material world, to find them a place in the mind. Or, at least, so goes a standard reading of Descartes' philosophy.

As recently pointed out by Downing, Cartesians like La Forge and Malebranche argued explicitly along these lines. La Forge, in particular, argued that since the concept of force does not include the concept of extension, force does not belong to material bodies.[9] Contrary to force, though, the claim that color does not somehow "presuppose" extension is hardly convincing, since we cannot indeed think of anything colored which is not also extended. It was actually a standard piece of Aristotelian philosophy – defended also by Aquinas – that all sensible *qualities* (as for example colors) were predicated of the substance by being first predicated of the substance's *quantity*, which has indeed granted a prior position among the substance's accidents – or, more precisely, among the different categories to which the accidents may belong. Descartes too

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[8] *Principia* I 53; AT VIII-1 25, 12-22; CSM I 210*: "Et quidem ex quolibet attributo substantia cognoscitur; sed una tamen est cujusque substantiæ præcipua proprietas, quæ ipsius naturam essentiamque constituit, & ad quam aliæ omnes referuntur. Nempe extensio in longum, latum & profundum, substantiae corporeae naturam constituit; & cogitatio constituit naturam substantiae cogitantis. Nam omne aliud quod corpori tribui potest, extensionem præsupponit, estque tantum modus quidam rei extensæ; ut & omnia, quæ in mente reperimus, sunt tantum diversi modi cogitandi" (emphases added). Thought and extension, according to Descartes, can therefore be thought of both as some modes among the many and as "constituting the substance's nature", as he explains (while also trying to explain why this should not constitute a difficulty) a few propositions later; cf. *Principia* I 63-64. In the *Meditations* (to the best of my knowledge), Descartes does not speak of a *præcipuum attributum*, but is clearly committed to the same theory, speaking as he is of a *ratio communis extensionis* and of a *ratio communis cogitationis, sive perceptionis, sive conscientiæ* under which all pertinent attributes would fall (*conveniunt sub*); cf. *Responsiones* III; AT VII 176, 9-26; CSM II 124.

[9] Louis de la Forge, *Traité de l'esprit de l'homme* (Amsterdam: Wolfgang 1666), 251-52.

subscribed to some version of this theory in the *Rules*, where he made his case for pattering the differences between perceived colors after the difference between some shapes precisely on the account that "the concept of shape is so simple and common to be implicit in every sensibles" – i.e., in any sensible qualities.[10] *A fortiori*, therefore, this should hold true also for extension.[11] Descartes, indeed, never claimed that colors do not "presuppose extension", nor has he ever intended to reply on so dubious a claim (all the more without even caring to defend it) in order to ground his metaphysics of material substances. Malebranche was likely among the first to realize that for any argument along these lines to get off the ground it was not indeed enough to claim that all the modes of a *res extensa* must somehow "presuppose" or "imply" extension – this arguably being the case also for colors. Malebranche thus set the much stringent criterion that "all qualities of bodies must be relations of distance", so that colors, which without a doubt are not among these relations, would not count among the properties of a body.[12] On Malebranche' account, for something to be a mode of an extended substance it is not therefore enough for it to somehow *imply* extension: what makes of a mode of *res extensa* the mode of a *res extensa* is its being "the *result of* or *derivable from* body's having been divided into parts". Simmons has a similar argument and makes it her key argument for claiming that bodies are nothing but extended substances, crediting this metaphysical doctrine to Descartes himself.[13] As pointed out by Downing, Descartes has however never set forth any principle along these lines, which Downing furthermore proved to be "unmotivated" within Descartes' system. Downing still thinks that, never mind how unstated and unwarranted, this would actually be Descartes' best argument, so that she feels forced to conclude with regret that "Descartes founds his physics on a metaphysical *intuition*", and on nothing more than an intuition.[14] This reading is hardly appealing, and on Downing's own admission "speculative". This reading, furthermore, conflicts with the letter to Christina of Sweden quoted at the beginning of the

[10] *Regulæ* XII; AT X 413, 7-8; CSM I 41*.

[11] Descartes in the *Rules* seems to treat extension and figure largely on a par, whereas in his later writings he will insist on the priority of the former over the latter. The question, yet, is quite complex, most of *Regulæ* XIV being devoted precisely to the relation between these two notions, so that it cannot be possible to address it here.

[12] Downing, "Sensibles Qualities", 124. Cf. Malebranche, *Recherche de la verité* in *Œuvres completes de Malebranche*, ed. André Robinet (Paris: Vrin 1958), I 122-23.

[13]Alison Simmons, *Making Sense: The Problem of Phenomenal Qualities in Late Scholastic Aristotelianism and Descartes* (Dissertation in Philosophy at the University of Pennsylvania, Philadelphia), 189.

[14] Qualified by Downing as "essentialist; *Ibid.* 127 (emphasis added).

chapter, which Downing cannot therefore but denounce as "misleading".[15] In this key text Descartes states as clearly as possible that he took to have *established* that colors as we perceive them are not modes of extended substances only in the fourth and final book of the *Principles*, whereas at the beginning of the treatise he only *assumed* that this was the case. It is yet precisely on this section of the work that Downing and Simmons and many other scholars base most of their readings.[16] The point, though, is not where Descartes *claimed* that colors are not modes of bodies: the point is where he *proved* it – or, at least, where he took to have proven it. On a closer look, it indeed turns out that in the first book of the *Principles* Descartes explicitly warned the reader that he will consider the case of sensible qualities "in the appropriate place" (*infrà suo loco ostendetur*) – not here in the first book, though.[17] Descartes argues that in order to make sense of these sensible properties one would in fact have to enter quite a bit into the issue of the mind-body union, a topic (he claims) which cannot however be properly addressed at this stage of the work. Accordingly, the present work too will have to wait until §25 before being able to address it properly, by considering Descartes' doctrine of an "institution of nature" governing the passage from physiological stimuli to sensory ideas. Descartes comes back to the issue at the beginning of the second book of the *Principles*, but there too only to beg for his reader's patience, since "this is not yet the place to expound on the topic" (*accuratior ejus rei explicatio non est hujus loci*).[18] In light of the difficulties – both textual and systematic – denounced by its own proponents, it is therefore to be concluded that Descartes' metaphysics of modes is not enough, by itself, to establish that (phenomenal) colors are *not* properties of bodies. Moreover, and to conclude, if only what is *deducible* from the substance's "principal attribute" would count as a mode of that substance, this would imply that also imagination and sensing can be somehow

[15] Downing, "Sensibles Qualities", 114. Downing, by the same token, dismisses also Descartes' statement at the end of the *Principles* (to be discussed in what follows) that he had eventually managed to dismiss real qualities as a "bit of triumphalism… that he could not resists… as he reached the end of his magnum opus" (*Ibid.* 127).

[16] See once again To Chanut for Christina of Sweden, 26 February 1649; AT V 291-92.

[17] *Principia* I 48; AT VIIII-1 23, 15; CSM I 108.

[18] *Principia* II 2; AT VIII-1 41; CSM I 224*. The problem of the mind-body union is not of course to be reduced to the question of sense-perceptions. Even though the main topic of the present work demands such a restriction, it must be pointed out that at *Principia* I 48 Descartes does start considering the issue in relation to the *commotiones, sive animi pathemata*, whilst mentioning *sensus* only at a later stage. The 1649 *Passion de l'Âme* were indeed arguably intended by Descartes as an attempt to make clear how the mind-body union works, this being one of Descartes' main concerns in the 1640s. Descartes most likely intended to devote the entire sixth part of his *Summa*, which he had yet to shorten significantly in the fourth book of the *Principles*, where he discusses sense-perceptions virtually only in order to complete his 'natural philosophical' argument that bodies are nothing but extended things, without entering the topic of passions (which is indeed of minor or no importance in order to establish this claim).

"deduced" from the notion of the *res cogitans*. But in case they can be so deduced, it would follow that *all* thinking things – God included – imagine and sense, activities which, according to Descartes and according to virtually all philosophers of the time, require a body. In case the modes of a substance could and had to be deduced by the notion of this substance, it would therefore follow that (i) either imagination and sensibility are not modes of the human mind, or (ii) that God has a body. But it is clear that Descartes wanted to avoid as much as possible both of these conclusions.

If Descartes' theory of modes was unable by itself to establish that colors are nothing but extended things, Descartes could yet insist that the concept of a *qualitas realis* by which Schoolmen had been trying to account that the metaphysical status of sensible qualities was problematic, if not sheer nonsense, thereby making a compelling case (even though only *ad homines*) against sensible qualities in general. The subtle relations between late Scholastic philosophy and Descartes' philosophy have been studied in detail in the last decades, after Gilson's groundbreaking studies of the early 20th century. For the time being, one does not however need to adjudicate whether Descartes portraited Scholastics metaphysics fairly, and not even whether his arguments again them could have been adequately resisted by his opponents. As far as this work is concerned, it is indeed enough to determine whether *according to Descartes' own understanding of the notion of real qualities* he could legitimately concoct an argument for ruling out colors from the material world (Descartes himself, it turns out, thought he could not, so that in the end one does not even need to consider his opponents' reply). Some of the difficulties pointed out by Descartes were well-known to Aristotelians, who had been discussing for centuries, to name just one example, in which sense forms could be said to be "brought up from matter" (*eductæ a materia*).[19] The specifics of the theory were indeed highly debated, although virtually all Schoolmen agreed that bodies consisted of *matter* and *form*, some of these forms being *substantial* inasmuch as it was by virtue of them that a corporeal substance (a dog, say) is

[19] On Descartes' difficulty to make sense of the claim that forms are *eductæ a materia*, see for example *Principia* IV 198; AT VIII-1 322, 14-18; CSM I 285: "There is no way though of understanding how these same size, shape, and motion can produce something else whose nature is completely different from their own, as it is the case for the substantial forms and real qualities which many suppose to be in things". Cf. To Plempius, 3 October 1637; AT I 414: "Ex qua sententia sequitur tantam esse differentiam inter animas brutorum & nostras, ut nullum, quod sciam, validius argumentum fuerit hactenus ab ullo excogitatum ad contradicendum Atheis, & persuadendum mentes humanas ex materiæ potentia non educi". The problem was especially discussed in relation to the issue of spontaneous generation, which Descartes admitted, see for example (also in explicit relation to the issue of the generation of forms) To Regius, 22 December 1641; AT III 460; K 200.

what it is.[20] These material substances, it was argued, present a vast array of features, most of which changed or could at least change over time, being therefore styled as the substance's *accidents*. Aristotelians, moreover structured reality into ten categories, listing besides substance: quantity, quality, relatives, somewhere, sometimes and so forth. The substance's accidents were said to belong precisely to these categories, being accidental for a dog to be of this exact size or of such-and-such a color, both features which can and indeed do change over time. This pretty much standard account was yet complicated by the notion of a "*real* accident" and, accordingly, of a *real* accident in the category of quality (or, more simply, "*real* qualities"), mostly introduced by Scholastics in an attempt to make sense of Transubstantiation (more on this below). Despite remaining accidents, 'real' accidents were indeed said to be able to subsist on their own, without a substance to inhere in.

It was precisely this notion of separable entities which are nonetheless still accidents that Descartes attacked, working out as many arguments as he could think of in order to (in his own words) "explode" it:

> I do not suppose there are in nature any 'real qualities', which are attached to substances, like so many little souls to their bodies, and which are separable from them by God's power…. My principal reason for rejecting these 'real qualities' is that I do not see that the human mind has any notion, or particular idea, to conceive them by; so that when we talk about them and assert their existence, we are asserting something we do not conceive and do not ourselves understand. The second reason is that the philosophers posited these 'real qualities' only because they did not think they could otherwise explain all the phenomena of nature; but I find on the contrary that these phenomena are much better explained without them.[21]

Let us leave aside for a moment Descartes' "second reason" for now, which seems to work here as a mere subsidiary one (I will come back to it at the end of the chapter). According to Descartes' letter of 21 May 1643, the "principal reason" for rejecting real qualities is that we cannot *make sense of them*, inasmuch as the human mind is said to have no "notion, or particular idea, to conceive them by". The claim nonetheless conflicts with Descartes' opening remark that real qualities have been understood by Schoolmen to relate and interact with bodies (i.e., with extended substances) in the same way that in Descartes' own system the mind (i.e., the thinking substance) is said to relate and interact with the so-called 'personal body' to which it is

[20] Scholastics also admitted *non-substantial* forms, as in the case of artifacts. Descartes was aware of the distinction (unsurprisingly enough, given his training in La Flèche); cf. To Regius, January 1642; AT III 505; K 208. The topic is discussed more in detail in §19.

[21] To Mersenne, 26 April 1643; AT III 648-49; K 216.

attached. Accordingly, Descartes appeared to have a quite clear notion to conceive of these "qualities" – as a matter of fact, this is one of the clearest notions of his entire philosophy. Starting from the *Sixth Set of Replies* (completed in July 1641), Descartes had in fact been arguing that the idea of a real quality is "derived" (*desumptam*) from the idea of the mind, illustrating this point by considering the case of heaviness:

> When I conceived of heaviness (*gravitas*) as a certain 'real quality' inhering to solid bodies, although I called it a 'quality' inasmuch as it referred it to the bodies to which it inhered, by adding that it was 'real I was in fact thinking of it as a substance. In the same way clothing, regarded in itself, is a substance, even though when referred to the man who wears it, it is a quality. Or again, the mind, even though it is in fact a substance, can nonetheless be said to be a quality of the body to which it is joined. And although I imagined heaviness to be scattered throughout the whole body that is heavy, I still did not attribute to it the extension which constitutes the nature of a body. For the true extension of a body is such as to exclude any interpenetration of the parts, whereas I thought that there was the same amount of heaviness in a ten-foot piece of wood as in one foot lump of gold or other metal - indeed I thought that the whole of the heaviness could be contracted to a mathematical point. Moreover, I saw that the heaviness, while remaining coextensive with the heavy body, could exercise all its force in any one part of the body; for if the body were hung from a rope attached to any part of it, it would still pull the rope down with all its force, just as if all the heaviness existed in the part actually touching the rope instead of being scattered through the remaining parts. This is exactly the way in which I now understand the mind to be coextensive with the body – the whole mind in the whole body and the whole mind in any one of its parts. But what makes it especially clear that my idea of heaviness was largely derived from the idea I had of the mind (*sed ex eo præcipue apparet illam gravitatis ideam fuisse ex parte ab illâ, quam habebam mentis, desumptam, quòd*) is the fact that I thought that heaviness carried bodies towards the center of the earth as if it had some knowledge of the center within itself. For this surely could not happen without knowledge, and there can be no knowledge except in a mind.[22]

Descartes' argument is elaborated, so that it would require quite a few pages to unpack all of its steps, some of which are furthermore tailored to the case of heaviness and it would be far from trivial to extend it to substantial forms in general. The crucial starting point of Descartes' argument has at any rate nothing to do with the specific case of *gravitas*, but is based on a general difficulty with the late Scholastic notion of a *real* quality as such. In the very same set of *Replies*, Descartes objects in fact that "it is completely contradictory that there should be *real* accidents, since whatever is *real* can exist separately from any other subject. Yet, anything that can exist

[22] *Responsiones* VI; AT VII 441, 23 - 442, 26; CSM II 297-98*. See also To Elisabeth, 21 May 1643; AT III 6657; K 219: "We imagined these qualities to be *real*, that is to say to have an existence distinct from that of bodies, and so to be substances, although we called them qualities".

separately in this way is a substance, not an accident".[23] As masterfully shown by Des Chene, Descartes equated being a substance with being able to exist on its own – God's ordinary concourse aside, this being required by all finite beings in order to subsist.[24] Descartes' refusal of the late Scholastics' (especially Suárez's) notion of a "separable accident" hinges to a good extent on a different understanding of God's power or, to be more specific, on the relation between God's "ordinary" and its "extraordinary" power. The topic surfaces in the 26 April 1643 letter to Mersenne quoted above ("qui en puissent estre separées par la puissance divine"), but it is in the *Sixth Replies*, in challenging the notion of a real accident, Descartes is likely to have addressed it most explicitly. Forestalling the objection of anyone used to Suárez's distinctions, Descartes contended in fact that

> The claim that real accidents cannot be separated from their subjects 'naturally', but only by the power of God, is irrelevant. For to occur 'naturally' is nothing other than to occur through the ordinary power of God, which in no way differs from his extraordinary power, what they bring about in the real world being exactly the same (*nihil enim aliud est fieri naturaliter, quàm fieri per potentiam Dei ordinariam, quæ nullo modo differt ab ejus potentiâ extraordinariâ, nec aliud quicquam ponit in rebus*). Hence if everything which can naturally exist without a subject is a substance, anything that can exist without a substance even through the power of God, however extraordinary, should also be termed a substance.[25]

By denying real accidents, Descartes was not however just opposing a point among the many of Suárez's sophisticated taxonomy of beings, but had entered the deep waters of theology, from which throughout his life he had been trying as hard as possible to stay away. Envisaging the thrust of Descartes' position (already outlined in the 1637 *Essais*), in the *Fourth Objection* Arnauld indeed pointed out that this piece of Descartes' philosophy would have represented "the greatest stumbling block for the theologians".[26] It was indeed precisely by reference to the concept of separable accidents which could detach themselves – by virtue of God's extraordinary power – from the substance in which they inhered to become the accident of a different substance that most Catholic theologians of Descartes' time intended to account for the miracle of the Transubstantiation, where the whiteness of a piece of bread was said to remain

[23] *Responsiones* VI; AT VII 434, 23-27; CSM II 293.

[24] Cf. Dennis Des Chene, *Physiologia: Natural Philosophy in Late Aristotelian and Cartesian Thought* (Ithaca, NY- London: Cornell University Press 1996).

[25] *Responsiones* VI; AT VII 434, 27 - 435, 8; CSM II 293*. On the grounding of real distinction in God's potency, see *Principia* I 60; AT VIII-1 29, 6-15.

[26] *Objectiones* IV; AT VII 217, 15- 218, 6.

whereas the piece of bread would have been turned into the body of Christ, thereby ending up with the accident "white" inhering in a different substance than before. Des Chene has indeed shown at length how Suárez had drawn quite of few of his ontological distinctions precisely to make "metaphysical room" for the miracle of the Transubstantiation (as pointed out also by Menn).[27] One would be tempted to speculate that were Suárez not concerned with making sense of the Eucharist, he would have ended up embracing a much terser metaphysics, so that Descartes' insistence to distinguish philosophy from revealed theology would have made of him a Suárez without Transubstantiation and, accordingly, without real accidents. Descartes, when pressed on the issue, insisted that human beings in general (as the theologians themselves admitted) had a very poor understanding of so miraculous an event, and excused himself by pointing out that he was not even a theologian.[28] Descartes, still, professed to be a Catholic and devoted the book to the Sorbonne, so that he was arguably expecting a young doctor of this theological faculty like Arnauld to ask him about this question, while most likely hoping he would not. Descartes, accordingly, in order for his system to be accepted, had to show that he could account for this miracle in terms of his own philosophy, and worked out a few solutions in this regard.[29]

The topic is complex, Descartes' good faith disputed (already by Hobbes), the adequacy of his solution problematic, and he himself was not completely convinced that his account of the

[27] Stephen Menn, "The Great Stumbling Block: Descartes' Denial on Real Qualities" in Roger Ariew – Marjorie Grene eds., *Descartes and His Contemporaries: Meditations, Objections, and Replies* (Chicago - London: University of Chicago Press 1995), 182-207, especially 192. On Descartes' rejection of "real accidents" see also Laura Keating, "The Role of the Concept of Sense in *Principles* IV, 189-98", *British Journal for the History of Philosophy* 12/2 (2004): 199-222. Keating claims that these metaphysical considerations, once integrated with what she calls "the doctrine of the senses", provide an *a priori* argument against color-qualities. The current chapter is meant to show not only that no arguments along these lines are to be found (as a matter of fact) in Descartes' works, but also that Descartes was fully aware that endorsing any of them would have resulted in a straightforward refutation of his own theory of the mind-body union.

[28] Cf. To Mesland, 9 February 1645; AT IV 165: K 242: "As for the manner in which one can conceive the body of Jesus Christ to be in the Blessed Sacrament, I do not think it is for me to explain, since the Council of Trent teaches that he is there 'with that form of existence which we can scarcely express in words'. I quoted these words on purpose at the end of my *Reply to the Fourth Objections* to excuse myself from speaking further on the topic, and also because not being a theologian by profession, I was afraid that anything I might write would be less well taken from me than from another".

[29] That Descartes was keenly aware of the problem is further attested by an early letter to Mersenne, 25 November 1630; K 28*: "I think I will send you this discourse on light as soon as it is complete, and before sending you the rest of the *Dioptrics*, because in it I want to give my own account of colors, and consequently I am obliged to explain how the whiteness of the bread remains in the Blessed Sacrament".

Eucharist could properly work or, at least, that it would be accepted.[30] Presenting his own solution to the problem to the Jesuit Mesland, Descartes wrote in fact

> I will venture to tell you here in confidence a manner of explanation which seems to me quite elegant and very useful for avoiding the slander of heretics who object that our belief on this topic is entirely incomprehensible and involves a contradiction. I do so on condition that if you communicate it to anyone else you will please not attribute its authorship to me; and on condition that you do not communicate it to anyone at all unless you judge it to be altogether in accord with what has been laid down by the Church.[31]

Descartes' concerns were serious: the diffusion of this letter to Mesland will indeed result in the 1663 condemnation to the *Index* of Descartes' works *donec corrigentur*. And yet, despite being fully aware of the difficulties he was running into and his attitude to smooth over theological problems, Descartes was adamant in claiming that whatever could exist on its own (not considering God's ordinary concourse) could not be anything but a substance.

Even granting Descartes his point of separability, Scholastics would yet have likely replied that (i) qualities like heaviness could not still be understood as substances, heaviness being *attributed to* a body – i.e., on Descartes' account, to what counts by itself as a substance – the way only accidents and qualities can; and (ii) that heaviness was on their account a *corporeal* quality, whereas Descartes made of it a *mental* entity, arguing as he did that this notion has been "derived from the idea of the mind". As for (i), Descartes was ready to bite the bullet, admitting that he did indeed admit that "one substance can be attributed to another substance" (*fateor quidem unam substantiam alteri substantiæ posse accidere*). With a crucial proviso in order, though:

> I do admit that one substance can be attributed to another substance. When this happens it is not however like the substance itself becomes an accident, but only that it is accidental that this substance is attributed to the other. Thus, when clothing is the attribute of a man, it is not the fact that clothing itself is an accident: the point is that is only accidental [for a man] to 'be clothed'.[32]

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[30] For a sympathetic account of Descartes' view on the matter, see Jean-Robert Armogathe, *Theologia Cartesiana: L'explication physique de l'Eucharistie chez Descartes et Dom Desgabets* (The Hague: Martinus Nijhoff 1977).

[31] Cf. To Mesland, 9 February 1645; AT IV 165; K 242.

[32] *Responsiones* VI; AT VII 435, 8-13; CSM II 293* (emphasis in the original): "Fateor quidem unam substantiam alteri substantiæ posse accidere; atqui, cum hoc contingit, non ipsa substantia est quæ habet formam accidentis, sed solus modus quo accidit, ut, cum vestis accidit homini, non ipsa vestis, sed tantummodo *vestitum esse* est accidens" (I have departed quite strongly from a literal translation in order to better convey the thrust of Descartes' point).

As for the second point too, Descartes granted that even the mind – *qua* embodied – could be said to be "corporeal" in the Scholastic sense. On a par with mind, real qualities like heaviness could not however be conceived as *res extensæ*, as the above-mentioned remarks that the center of mass of a body could be treated as a point had been intended to prove: the alleged extension of like a quality is indeed for Descartes of a completely other kind than the extension in height, breadth and depth proper to bodies:

> They [Schoolmen] deny that heaviness is a substance, but that makes no difference, because they conceive it in fact as a substance since they think that it is real and that it is possible by some power – namely divine power – for it to exist without the stone. Again, it makes no difference that they think it is corporeal. For if we count as corporeal whatever belongs to a body, even though not of the same nature as body, then even the mind can be called corporeal, in so far as it is made to be united to the body. On the other hand, if we regard as corporeal only what has the nature of body, then this heaviness is no more corporeal than the human mind is.[33]

In the letters of the second-1640s Descartes phrased the point by distinguishing between the *extensio substantiæ* of corporeal substances and the *extensio potentiæ* proper to non-corporeal ones: in Descartes' views, a quality like heaviness and the mind could indeed be said to be "extended" the way corporeal substances are, but only insofar as they can exert their power on the body they are attached to, so that in their case one cannot speak of the "extension of a substance" but only of an "extension of power", the term designating the 'sphere of action' of *gravitas* and of the mind, as it were.

The analogies between real qualities and thinking substances ran even deeper still, according to Descartes, although it took him a few years to spell out the claim made in the 1641 *Sixth Replies* that the notion of the qualities "has been largely derived from the idea I had of the mind". Descartes, indeed, claimed that the Scholastic notions of real qualities and substantial forms had been "put together, or constructed by myself" (*a me conflatas effictasve*) from the idea of mind *and* the idea of body, thereby clearly implying that the formation of like metaphysical notions could not be accounted for by reference to the notion of the *res cogitans* alone.[34] Like a combination of heterogeneous substances was for Descartes illegitimate, and it is most probably for this reason

[33] To Arnauld, 29 July 1648; AT V 223; K 358* (emphasis added).

[34] Cf. *Responsiones* VI; AT VII 442, 30 - 443, 6; CSM II 298. As already made clear in §7, like metaphysical notions must therefore count among the factitious ideas, which are not to be equated with the imaginative ones (according to Descartes the idea of the mind out of which like notions are said to be made up escapes indeed the domain of the imagination).

that on 26 April 1643 he wrote to Mersenne that as far as he could see "the human mind has any notion, or particular idea, to conceive" of real qualities (*ie ne voy pas que l'esprit humain ayt en soy aucune notion, ou idée particulière, pour les concevoir*).[35] Descartes himself, though, must have immediately realized that this statement was in tension with what he had been arguing elsewhere, so that after sending his letter to Mersenne he kept on musing on the topic. He was especially concerned with figuring out why it was that so problematic a notion could have enjoyed so much acceptance among his contemporaries, and in the centuries before him. Although it is impossible to enter the topic here, I suspect that around this time Descartes came in fact to conceive of real qualities as *idola tribus* and no longer as *idola theatri* as he was most likely tempted to do before. In his *Novum Organon* (1620) Francis Bacon distinguished indeed between the mistaken notions which are "rooted in human nature itself and in the very tribe or race of men"[36] and the errors that derives from accepting flawed philosophical principles, the way Bacon and Descartes took to be Aristotle's. I suspect that in the early 1640s Descartes started to understand notions such as the one of real qualities no longer as cultural products, but as *idola* somehow "rooted in *human* nature" – specifically in *human* nature, indeed, as opposed to the nature of the disembodied mind by itself. Hence their widespread – actually, universal – acceptance.

Taking his cue from Elisabeth's difficulties about the mind-body union, in a letter written on 21 May 1643 (just a few weeks after having replied to Mersenne), Descartes presented thus his celebrated theory of the mind's primitive notions, described by him as the *originaux* – the models, the exemplars – which would constitute the basic explanatory patterns of reality: "on the basis of which we form all our other conceptions" (*sur les patrons desquels nous formons toutes nos autres connaissances*).[37] Descartes, contrary to what his readers were likely to have expected, did not list two, but *three* of these *notions primitives*: (i) the mind; (ii) the body; (iii) the mind-body union, a notion "on which depends our notion of the soul's power to move the body, and the body's power to act on the soul by causing its sensations and passions".[38] In so doing, Descartes was as a matter of fact refuting his previous claim to Mersenne that "the human mind has any notion,

[35] See the already-quoted To Mersenne, 26 April 1643; AT III 649; K 216.

[36] Francis Bacon, *Novum Organum*, eds. Graham Rees – Maria Wakely, in *The Oxford Francis Bacon* (Oxford: Oxford University Press 2004), vol. XI, aphorism 41.

[37] To Elisabeth, 21 May 1643; AT III 665; K 218. In this letter (AT III 667-68) Descartes refers to the same example of heaviness discussed in the *Sixth Replies*.

[38] *Ibid.* Descartes, to be fully accurate, starts by listing "the most general [notions] – those of being, number, duration, etc. – which apply to everything we can conceive". Descartes' own list of the Medieval *transcendentalia* would thus features as the first of *four* classes. Following scholars' practice, this list can nonetheless be left aside for the time being, to focus on the three non-general notions alone.

or particular idea" to conceive of real qualities. Indeed, since *in principle all* of our notions (both the correct and the mistaken ones) must somehow originate from these primitive notions, also the notion of a real quality had now to find its place in this classification, although of course this did not rule out that the notion of a real quality is in fact illegitimate. The doctrine of the three primitive notions is indeed making a claim on the ultimate epistemological *origin* of all human notions, and is not intended to secure a priori the *validity* of all of them. Descartes did not abandon the claim already elaborated in the *Sixth Replies* that real qualities are to be to be construed as *non-corporeal substances*. From the 1643 letter to Elisabeth onwards, though, he added the crucial remark that the reason why the real qualities' action on three-dimensional bodies appeared to be so natural and unproblematic to most people was because this activity had been patterned after the mind's own activity upon the so-called 'personal' body. Not that the Aristotelians, according to Descartes, had somehow envisaged the *Meditations* doctrine of the union between the *res cogitans* and the *res extensa*. Aristotelians too, though (they too being *human* beings), constantly experienced this union every day of their life. Accordingly, Descartes claims that Aristotelians ended up applying without noticing the notion of such an interaction between a non-corporeal and a corporeal substance they experienced in themselves to other substance, attributing to bodies some "real qualities" which they had patterned after their own minds. If we human beings could think of a non-corporeal substance acting on a corporeal one, this was indeed according to Descartes only inasmuch as we are embodied. In a late letter to More, Descartes went actually so far as to argue that we can understand even God's action on the material world only in terms of the experience of the mind's action on the body, thereby suggesting that a pure mind would not be able to think of it.[39]

Descartes pointed out that these notions, despite all being primitive, are not perfectly on a par because of that, at least not as far as the subject's coming to know about them is concerned. In the first two cases, Descartes has argued indeed at length throughout the *Meditations* that we do have a "clear and distinct" understanding of what a mind and a body are, in light of the *innate intellectual ideas* of thought and extension, respectively. The cognitive power by itself, as not yet embodied, can in fact for Descartes conceive not only of itself, but also of geometrical notions: albeit greatly *helped* by the imagination, mathematics is ultimately for Descartes an intellectual discipline, a science that a pure mind could attain by its own.[40] For Descartes, on the other hand, the *vis cognoscens* could not come to know of its embodiment "simply by itself and without any

[39] On the issue see Daniel Garber, "What Descartes Should Have Told Elisabeth" in Id., *Descartes Embodied: Reading Cartesian Philosophy through Cartesian Science* (Cambridge: Cambridge University Press 2000), 168-88.

[40] The point in made especially clear in To Elisabeth, 28 June 1643; AT III 691-92; K 227.

sense-experience" (*absque ullo sensuum experimento, ex proprii ingenii viribus*).[41] The mind-body union is indeed for Descartes an *adventitious*, not an innate notion.[42] It is actually precisely for this reason that Descartes had to make room for the notion of the mind-body union as an additional primitive one, because it presents us with an explanatory pattern that neither is right away in the pure mind, nor can be *deduced* from the notions of mind and body taken by themselves (were this the case, the union would not count as primitive, indeed). The experience of the mind-body union teaches in fact something that the mind by itself would according to Descartes be unable to attain and that the pure mind, once presented with it, still cannot fully understand. Descartes claimed that we do indeed lack a proper intellectual insight into this union, which nonetheless "everybody invariably experiments [it] in himself without philosophizing" (*chacun éprouve toujours en soi-même sans philosopher*). This union, non-deducible and non-necessary, is indeed for Descartes something we *happen to live* but cannot properly *fathom*:

> What belongs to the union of the soul and the body is known only obscurely by the intellect alone or even by the intellect aided by the imagination, but it is known very clearly by the senses. That is why people who never philosophize and use only their senses have no doubt that the soul moves the body and that the body acts on the soul. They regard both of them as a single thing, that is to say, they conceive their union; because to conceive the union between two things is to conceive them as one single thing… Metaphysical thoughts, which exercise the pure intellect, help to familiarize us with the notion of the soul. The study of mathematics, which exercises mainly the imagination in the consideration of shapes and motions, accustoms us to form very distinct notions of body. But it is the ordinary course of life and conversation (*en usant seulement de la vie et des conversations ordinaires*), and abstention from meditation and from the study of the things which exercise the imagination, that teaches us how to conceive the union of the soul and the body.[43]

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[41] *Epistola ad Voetium* (1643); AT VIII-2 166, 20 - 161, 1: "Sed notandum est eas omnes res, quarum cognitio dicitur nobis esse à naturâ indita, non ideo à nobis expresse cognosci; sed tantùm tales esse, ut ipsas, absque ullo sensuum experimento, ex proprii ingenii viribus, cognoscere possimus. Cujus generis sunt omnes Geometricæ veritates…".

[42] Accordingly, it cannot be maintained that being *primitive* and being *innate* mean for Descartes one and the same thing, contrary to what claimed by Alan Nelson, "Cartesian Innateness" in Janet Broughton – John Carriero eds., *A Companion to Descartes* (Malden: Blackwell 2008), 319-33, especially 324.

[43] To Elisabeth, 28 June 1643; AT III 691-92; K 227*. In many text, and most notably of all in his exchange with Regius in the early 1640s, Descartes insisted that man (*qua* embodied mind) is not to be understood as an *ens per accidens* but as *one* thing, arguing that mind and body are not completely unrelated substances as it would be the case for a man and his vest, for example. Even there, though, Descartes admitted that the mind-body union is still "contingent *in a sense*" (*quodammodo*), "because when we consider the body alone we perceive nothing in it demanding union with the soul, and nothing in the soul obliging it to be united to the body". Cf. To Regius, 22 December 1641; AT III 460-61; K 200 (emphasis in the original). For a more detailed analysis of this letter and,

The mind's interaction with the body and their close union is indeed for Descartes something of which he have an unquestionable "experience" any time we rise our arm, for example, despite the fact we have no clue about how this union is to be explained nor, more specifically, as for this instance of the union, what is going on in the body we do still call 'our' for a volition to result, through a complex motion of muscles and tendons of which most people ignore even the existence, in our hand's pointing at the sky:

> That the mind, which is incorporeal, can set the body in motion is something which is shown to us not by any reasoning or comparison with other matters, but by the surest and plainest everyday experience (*sed certissima et evidentissima experientia quotidie nobis ostendit*). It is one of those self-evident things which we only make obscure when we try to explain them in terms of other things.[44]

According to Descartes the mind-body union and the mind's action on the body is indeed something unintelligible and yet real, something which escapes our "philosophizing" and "meditation" but that our daily living and practice with other human beings attest with the uttermost certainty. Descartes, of course, realized right away that his Scholastic opponents would not have appreciated this fresh move towards existentialism, but would have taken it as a plain admission that Descartes had no idea how to handle the mind-body union, and criticized him accordingly. Envisaging the objection, from the *Sixth Replies* onwards Descartes adopted the strategy of sending back the objection to his opponents, as it were, arguing that Scholastics had no better understanding of how real qualities could act on a body, despite constantly appealing to entities of that sort in order to explain most physical phenomena. As a matter of fact, it was precisely in relation to this issue that Descartes introduced the case of *gravitas* in the

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more generally, of this piece of Descartes' philosophy, see Dennis Des Chene, *Spirits and Clocks: Machine and Organism in Descartes* (Ithaca, NY - London: Cornell University Press 2001), 146-57. According to Descartes, the disruption of the mind-body union does not indeed entail by itself the annihilation of the mind, which the *Meditations* had in fact argued at length to be capable of subsisting on its own (if one does not take into account God's "ordinary concourse", which is yet required by all finite beings in order to exist). The status of the mind-body union in Descartes' philosophy is indeed notoriously problematic, as this union seems to perilously hesitate half-way between a true union and an arbitrary one. Many interpreters have indeed doubted that Descartes could legitimately make room for any in-between notion as the one defended in correspondence with Regius, as well as in the *Meditations* written approximately in the same years and in many other of his writings. Although Descartes seems to have genuinely intended to defend a quite robust understanding of the union between mind and body, it remains in fact doubtful that he had the conceptual resources to do so.

[44] To Arnauld, 29 July 1648; AT V 222; K 358.

Sixth Reply, a case he kept on discussing until his last years, always with the same critical intention in mind:

> Most philosophers, who think that the heaviness of a stone is a real quality distinct from the stone, think they understand clearly enough how this quality can impel the stone towards the center of the earth, because they think that they have a manifest experience of this (*quia se putant habere ejus rei experientiam manifestam*). I, however, am convinced that there is no such quality in nature, and that consequently there is no real idea of it in the human intellect; and I think that in order to represent this heaviness to themselves they are using the idea they have within them of an incorporeal substance. Therefore, *it is no harder for us to understand how the mind moves the body than it is for them to understand how such heaviness moves a stone downwards*.[45]

As the passage shows, Descartes' main intention in discussing the received account of heaviness was not to argue that the Scholastic theory of real qualities is to be rejected inasmuch as *intelligible*, but only that his own account of the mind's action on the personal body was not more obscure and problematic than a real quality's action on a body, a notion Schoolmen made constant use of in their physics. Descartes warned thereby his opponents that refuting the notion of a mind-body union *qua* unintelligible would have resulted in an outright refutation of their own natural philosophy as a whole. The fact that we cannot *understand* how a non-corporeal substance can act upon a corporeal one is indeed for Descartes no argument to deny like an interaction, since we do have the "surest and plainest *experience*" that this is at least in once instance the case. Being real, the interaction between corporeal and non-corporeal substances is therefore possible, and possible *in general*, of course (despite being directly ascertained by everyone only in his own case). Asked by Gassendi how the *res cogitans* and the *res extensa* could interact despite being substances of different kinds, Descartes only replied that "it cannot be proven" (i.e., *rationally* established) that this is *not* the case, whilst experience teaches us that it is so.[46] Descartes grudgingly admitted that he could not in fact provide any better answer to Gassendi's difficulty, scornfully adding though that "the most ignorant people could, in a quarter of an hour, raise more questions of this kind than the most learned men could deal with in a lifetime" – the *savant* Descartes included.[47] Descartes' only answer to this question was in fact an appeal to a brute fact of experience. "But how can this be, and how can the soul be affected by the body and vice versa, when their natures are completely different?", a perplex student

[45] To Arnauld, 29 July 1648; AT V 222-23; K 358* (emphasis added).

[46] Letter to Clerselier, January 12, 1646, AT IX-1 213, CSM II 275.

[47] *Meditations*, AT IX-1 213; CSM II 275*.

asked Descartes. "*Hoc explicatu difficillimum; sed sufficit hic experientia*" – he is reported to have replied: "This is extremely difficult to explain; but here our experience is sufficient, since it is so clear on this point that it just cannot be denied. This is evident in the case of the passions…"[48] "There is nothing that nature teaches me more vividly that that I have a body", wrote Descartes already in the *Meditations*.[49] According to Descartes the mind-body union remains nonetheless a brute *fact*. Not an "occult hypothesis" as denounced by Spinoza in the preface to the *Fifth Book* of the *Ethics*, though, but – as Descartes wrote to Arnauld – a "prime evidence" and yet, at the same time, something beyond our intellectual grasp. By means of his theory of an "institution of nature" (on which much will be said in §25 and following) Descartes did in fact only intend to explain *how* the correspondence between bodily and mental states *works*, not *why* there is in the very first place such a union between two altogether different substances.

One should be very careful not to misconstrue Descartes' argument here. Descartes' point was not that each of ourselves has an *immediate* and as intimate as possible *experience* that an interaction between a corporeal and a non-corporeal substance is the case, whereas Schoolmen only *inferred* the existence of a real quality from some behaviors of a body they believed could not be explained otherwise. For Descartes, the problem with the non-corporeal "substances" of the Scholastics was not indeed that their interacting with corporeal substances could not be ascertained directly and from the first-person perspective. As the next chapters make clear, Descartes admitted in fact like inferences in his philosophy: as a matter of fact, it is precisely by reason of such an inferential reasoning that he thought to have positively established the existence of other (human) minds. According to Descartes, some corporeal things happen indeed to behave in ways which could not be explained by reference to nothing but particles in motions, so that one was forced to ascribed to them a non-corporeal principle of action (competent speaking being for Descartes the most compelling instance of a behavior that exceeded the possibility of bodily mechanism; more on the topic in §20). As what follows is intended to show, Descartes' point was that, contrary to what argued by Aristotelians, a stone's fall towards the ground and similar phenomena do not require to posit anything besides variously shaped particles with various motions, thereby rejecting all substantial forms different than men's, as well as all real accidents and qualities as superfluous. According to Descartes, though, the matter was to be determined case by case, and could not be set once and for all as a matter of principle.

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[48] *Conversation with Burman*, 16th April 1648; AT V 163; K 146*.

[49] *Meditationes* VI; AT VII 80, 27-28; CSM II 56*: "Nihil autem est quod me ista natura magis expresse doceat, quàm quòd habeam corpus".

Descartes admittedly pointed out many a time that the interaction of non-corporeal entities such as the substantial forms and the real qualities of the Schoolmen with corporeal entities was plainly "unintelligible", contrary to what happens to be the case for body-body interaction:

> Now we perfectly grasp (*optimè comprehendimus*) how the different size, shape and motion of the particles of one body can bring about various local motions in another body. There is yet no way of understanding how (*nullo autem modo possumus intelligere, quo pacto*) these same size, shape, and motion can produce something else whose nature is completely different from their own, as it is the case for the substantial forms and real qualities which many suppose to be in things. Nor are we able to understand how (*nec etiam quo pacto*) these qualities, or forms, could have the power subsequently to bring about local motions in other bodies.[50]

Lamenting that something escapes our comprehension does not however mean to rule it out as absurd, and the previous chapters (especially §9 and §15) have already made clear that for Descartes one should be careful to draw conclusions only from what he knows, never from what he ignores or cannot fully grasp. Descartes' refusal to endorse something like an inference from *being unintelligible* to simply *being not* was not yet only dictated by his usual argumentative rigor and caution. If an argument along these lines would have ever gotten off the ground, this would indeed have exploded Descartes' own philosophy. Descartes' pattering of real qualities and their action on bodies after the mind and its own action on the body to which it is conjoined (questionable as it is) had in fact the straightforward consequence that any *a priori* argument against the former would have equally applied to the latter. "Why should intelligibility problems rule out that kind of interaction, whereas such problems clearly must also arise for mind-body interaction?", asked Rozemond with reason.[51] And indeed any argument refuting non-corporeal entities simply because their interaction with corporeal ones was "unintelligible" would have ended up proving too much, refuting also Descartes' theory of the mind-body union. Descartes, therefore, had no reason to violate his standard argumentative procedure just to come up with an argument against his own philosophy. And he did not do it, in fact.

For Descartes it remained indeed to be determined *only on empirical grounds* whether there are other like instances in nature or human beings are indeed the only specimen of a non-corporeal substance interacting with a corporeal one. Descartes corrected accordingly his opponents' conviction that the *Meditations* aimed at proving that "there are bodies which do not think" (*esse*

[50] *Principia* IV 198; AT VIII-1 322, 11-20; CSM I 285*.

[51] Marleen Rozemond, "Descartes on Mind-Body Interaction: What's the Problem?", *Journal of the History of Philosophy* 37 (1999), 455.

corpore quæ non cogitant) remarking that in that work he had only intended to establish that "there *can* be *some* bodies which do not think" (*quædam corpora sine cogitatione esse possent*).[52] Which ones exactly (if any at all) had however to be ascertained by subsequent empirical researches. Analogously for the existence of material objects with no real qualities and substantial forms attached – these qualities and forms, once again, been conceived by Descartes in analogy with and on the model of the soul, *viz.* of the thinking mind. Garber has therefore perfectly captured the logic of Descartes' argument when he writes that the argument presented in the *Meditations*

> can at best establish that our ideas of sensations result from extended things *capable* of existing apart from mind. But nothing in the argument itself establishes that our sensations result from things that *actually* exist apart from mind… the argument leaves open the question as to whether the bodies from which our sensations arise exist apart from or united to a thinking substance.[53]

For Garber, according to whom the *Meditations* were intended to prove that bodies (other than human ones) are not united to non-material ones to form genuine individuals as it is the case for human beings, this is however to be understood as a major limit of Descartes' philosophy. Since it "falls short of excluding the possibility that *all* bodies in the world external to the mind may be united to the mind", Garber concludes in fact that the argument presented in the *Meditations* "by itself fails to ground a purely mechanistic physics in terms of size, shape, and motion, and it fails to eliminate a principal competitor to [Descartes'] program"[54] – the physics of real qualities and substantial forms of the Scholastics, namely. This is all very true, but it would be an error to interpret it as a blind spot of Descartes' overall argument that non-human bodies are nothing but extended substances. What Garber denounced as a (most probably unwitting) shortcoming of Descartes' philosophy in general proves in fact to be the utmost conclusion that Descartes believed it could be achieved by *prima philosophia* alone. As clearly attested by the exchange from the *Second Set of Objections and Replies* quoted above and from the many other passages discussed in this section, Descartes was fully aware of this shortcoming of the *Meditations* argument, which is his views was intrinsic to 'first philosophy' as such. But if 'first philosophy' had eventually reached its limits, according to Descartes this did not mean that there remained nothing more to be said, but only it was time for 'natural philosophy' to take over. If 'first philosophy' had left open the *metaphysical possibility* that to *all*

[52] *Responsiones* VI; AT VII 444, 2-10; CSM II 299* (emphases added).

[53] Daniel Garber, *Descartes' Metaphysical Physics* (Chicago - London: University of Chicago Press 1992), 92 (emphases in the original).

[54] *Ibid.* 93.

bodies are attached mind-like entities, for Descartes the task of 'natural philosophical' enquiries was precisely to determine case by case whether this was the case or not. It is in fact only by means of his *natural philosophy* that Descartes intended to demonstrate that he could account for *all* physical phenomena other than language by appealing to nothing but extension, figure, and motion, thereby concluding that there were no reasons left to posit any real qualities and substantial forms in nature. Only at that point could Descartes eventually conclude that bodies are indeed *nothing but* extended things, with no mind-like entities attached.

In an important paper devoted precisely to the interplay 'first' and 'natural philosophy' in Descartes, Hatfield argued that according to Descartes "the first principles of his physics can… be given an *a posteriori* justification", whereas on the other hand Descartes "considered *a priori* demonstration [i.e. the arguments from 'first philosophy'] the only means of disposing of other explanatory principles, such as substantial forms, once and for all".[55] The first part of this work was intended to show that Descartes' argument that bodies are extended do not need nonetheless to rely on empirical considerations, as pointed out by Hatfield himself, according to whom as far as this specific issue is concerned "*a posteriori* modes of reasoning merely *supplement* metaphysical (here, *a priori* rational) modes of reasoning".[56] The aim of the second part of the current work is however to prove that according to Descartes 'first philosophy' is by itself inconclusive about whether bodies are nothing but extended substances, contrary to what claimed by Aristotelians. For Descartes in order to get rid of substantial forms phenomenological and metaphysical considerations are not enough: what one needs are dissections.

In the *Meditations*, if one reads them very carefully, Descartes made explicit that his austere metaphysics of corporeal substances can be established only after a complete survey of physical phenomena in the Aristotelian sense of the term, as including among its most difficult instances the workings of the vegetative and sensory soul and, more specifically, sense-perception. The demonstration of the argument, that is to say, had to wait till the end of the *Principles*, as Descartes will later write also to Christina of Sweden, given that Descartes' previous attempts to deal with the issue (the *Treatise on Light* and the *Treatise on Man*) were still unpublished as a result of Galileo's condemnation. Descartes claimed to his Paris fellow-scientists – always in the *Sixth Set of Replies* – that he was confident that the most insightful of them had nonetheless already understood what he had been after in the *Dioptrics*, where he thought to have firmly

[55] Hatfield, Gary. "First Philosophy and Natural Philosophy in Descartes" in A. J. Holland ed., *Philosophy, Its History and Historiography* (Dordrecht: Reidel 1985), 154, 156.

[56] *Ibid.* 157 (emphasis added).

established that real accidents are not even required to account for vision, despite the fact that this had been standardly taken to be the most problematic and 'less material' of all senses.

> The principal argument which induced philosophers to posit real accidents was that they thought that sense-perception (*sensuum perceptiones*) could not be explained without them, and this is why I promised I will give a very detailed account of sense-perception in my *Physics*, taking each sense in turn. Not that I want any of my results to be taken on trust, but I thought that the explanation of vision which I had already given in the *Dioptrics* would make it easy for the judicious reader to guess what I was capable of accomplishing with regard to the remaining senses.[57]

As Descartes had already made clear in his *Replies* to Arnauld, his first concern was indeed not to deny that there can be real accidents *on metaphysical grounds*, but to show that *as a matter of fact* there was no need to posit like entities in order to make sense of physical phenomena and of sense-perception. As Descartes pointed out, in the 1637 *Essays* he had never denied the existence of real accidents, not had he been making this claim in the *Meditations*:

> In the *Dioptrics* and the *Meteorology* I did not make use of such qualities in order to explain the matters which I was dealing with (*non usus sum ad ea de quibus agebam explicanda*). But in the *Meteorology*, p. 164, I expressly said that I was not denying their existence. And in the *Meditations,* although I was supposing that I did not yet have any knowledge of them, I did not thereby suppose that none existed.[58]

Descartes' reply to Arnauld is usually construed as a diplomatic move which would hide his true intentions to get rid once and for all of the entire Scholastic warehouse, and there is without doubt something true in this reading. Descartes himself, though, in a different set of *Replies* – always the *Sixth* – explicitly argued that to "explode the reality of accidents" (*ad accidentium realitatem explodendam*) it was enough to notice that "whatever is real can exist separately from any other subject; but whatever can exist separately in this way is a substance, not an accident".[59] Descartes, therefore, had no problems to speak straightforwardly against these notions. Descartes, though, also realized that in order to prove that bodies were *nothing but* corporeal substances it would not have been enough for him to refute the Scholastic theory of sensible qualities. Heaviness and redness could indeed be reconceived in terms of non-corporeal substances on the model of the *res cogitans*, Descartes' point being that they could not be

[57] *Responsiones* VI; AT VII 435; CSM II 293*.

[58] *Responsiones* IV; AT VII 248, 18 - 249, 1; CSM II 173*.

[59] *Responsiones* VI; AT VII 434, 15 & 23-27; CSM II 293*.

understood in any other terms, at least if one was to make sense of them. Late Scholastic metaphysics, however, was flexible enough to possibly accept that the relation between three-dimensional matter and form could be re-construed (in keeping with Descartes' claims) in terms of a relation between two *substances*. Pasnau has indeed shown that late Scholastics understood matter and form less and less as *complementary metaphysical principles* always existing together (the case of intelligences aside) as it was the case for Aristotle, but rather conceived of them as some sort of *independent entities*, despite mostly qualifying this claim in order to preserve at least nominally Aristotle's σύνολον and his hylomorphism.[60] Descartes' intention, though, was not to refute one particular understanding of accidents, but to clear once and for all the physical world from all non-corporeal entities but the human minds and God's (and, possibly, some in-between intelligences). Descartes, therefore, could not be content with denying heaviness and redness *qua* real qualities, but wanted to show that the bodies' fall could be accounted for by nothing but particles in motions, and the perception of red by nothing but the reaction of the mind to some other particles, without having to attribute to bodies the property of being heavy and red they way we tend to claim that they are on the basis of our sense-perceptions. It is for this reason that Descartes referred both Arnauld and Mersenne to the *Essays*, and explicitly referred the latter to the *Principles*, which at that time he had apparently already started to draft.[61]

In his letter of April 1643 to Mersenne quoted at the beginning of the chapter Descartes had indeed listed one more reason not to admit of real qualities in nature, after having claimed that the notion of a like quality would be simply unintelligible (a claim that Descartes will retract and

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[60] See Robert Pasnau, *Metaphysical Themes: 1274-1671* (Oxford: Oxford University Press 2011). Descartes' contemporaries could accordingly speak of matter and form as *incomplete substances*, a category also Regius made use of in order to define the relation between mind and body; cf. To Regius, 22 December 1641; AT III 460; K 200. Descartes mentions the concept also in the *Meditations* (*Responsiones* III; AT VII 185, 24), without expressly taking a stance on its legitimacy – "*si dentur* qualitates reales, vel substantiæ incompletæ" – but he would of course have rejected them as a contradictory concept for the very same reason he rejected the notion of a real quality (it is not indeed by chance that the two concepts are listed one after the other): between a substance and its modes Descartes does in fact admit no intermediate entity.

[61] Garber has convincingly argued that Descartes' extensive and explicit engagement with Scholastic philosophy in the *Sixth Set of Replies* is at least in part to be explained with the project he matured precisely in those months (the late Spring and Summer 1641) to write a point-by-point confrontation of his own philosophy with the philosophy of the School, a project which survives only in a much diminished form in the *Principles* we know; cf. Daniel Garber, "Forms and Qualities in the *Sixth Replies*" in Id., *Descartes Embodied: Reading Cartesian Philosophy through Cartesian Science* (Cambridge: Cambridge University Press 2000), 257-75. The paper is especially important, on a more general level, for tracing the history and the conceptual evolution of Descartes' heaviness example, with all the problems it brings with itself.

conveniently qualify no longer than one month later). The "second reason" he mentioned to Mersenne – and the only one left after the May 1643 letter to Elisabeth – is indeed of a piece with the claim of the *Meditations* that "the principal argument which induced philosophers to posit real accidents was that they thought that sense-perception could not be explained without them":

> The second reason [for rejecting real qualities] is that the philosophers posited these 'real qualities' only because they did not think they could otherwise explain all the phenomena of nature (*tous les phainomenes de la nature*). But I find on the contrary that these phenomena are much better explained without them.[62]

As shown by Hattab, the arguments in favor of substantial forms and, more in general, non-material entities defended by the major exponent of Late Scholasticism were indeed for the most part taken from *natural philosophy*, rather than from logic of from pure metaphysics (as it was on the other hand the case for philosophers like Aquinas).[63] Accordingly, if Descartes was to dispose of "the useless junk of Scholastic entities",[64] he had to work out a natural philosophy that could disprove the arguments in their favor put forward by Suárez and the other Jesuit thinkers of the time. In order for his argument against non-geometrical bodily properties to succeed, Descartes realized that he had therefore to prove that *all* instances of sense-perception and *all* physical phenomena do not require to posit any entities of this sort to be explained, from which by appealing to a principle of metaphysical parsimony – to a razor – he concluded that bodies are indeed *nothing but* extended. Descartes, accordingly, treated extensively touch, taste, smell and hearing (singled out one after the other for close consideration in both *The World* and the *Principles*), as he spent pages and pages in making sense of as many as possible phenomena of nature by simply appealing to the motions of particles variously shaped. Descartes had in fact to prove that no *one* phenomenon – but language – could resist his razor, arguing at the end of the *Principles* that "there is no phenomenon of nature which has been overlook in this treatise" (as reads the title of *Principles* IV 199), and that all of them had been duly explained in terms of nothing but extension, figure, and motion. Complex phenomena such as the circulation of blood and magnetism became thus the testing grounds of his entire metaphysics of bodies. Descartes, accordingly, presented his purely mechanistic account of the two as a paradigm, to

[62] To Mersenne, 26 April 1643; AT III 649; K 216.

[63] Helen Hattab, *Descartes on Forms and Mechanism* (Cambridge - New York: Cambridge University Press 2009).

[64] *Notæ in Programma*; AT VIII-2 366, 22-23. For some contemporary responses to Descartes' criticism, see J. A. van Ruler, *The Crisis of Causality: Voetius and Descartes on God, Nature and Change* (Leiden: Brill 1995).

be put on display in some of the most strategic positions of his writings on natural philosophy: the preface to the *Essays*, respectively, and the main part of the fourth book of the *Principles* (where it is followed by nothing but his account of sense-perception).

For Aristotle and virtually all philosophers after him it was however enough to open their eyes (literally) to disprove Descartes' metaphysics of bodies, without any need to call into question the most sophisticated claims of his physics. They objected that the senses do in fact positively inform us that bodies are not only extended, but also red and hot. For Aristotelians, moreover, it was only through the senses that corporeal objects come to be known, so that nothing could be more basic than sense-perception (at least from an epistemological point of view). In their view, therefore, Descartes' account of the compass, exquisite as it might have been, could simply not call into question the very starting point of all physical sciences.

Descartes thought that if he could succeed in proving that Aristotelians were wrong about sense-perception, their overall philosophical account would have accordingly been shaken to its foundations, thereby lending major support to his more general claim about the nature of material objects. And in concluding the *Principles* (in the already-mentioned 199th proposition of the fourth book) Descartes made indeed explicit that he conceived of the theory of perception as the litmus test of his natural philosophy:

> A simple enumeration will make it clear that there is no phenomenon of nature which I have omitted to consider in this treatise. For a list of natural phenomena cannot include anything which is not apprehended by the senses. Now I have given an account of the various sizes, shapes, and motions <and the arrangement of the particles> which are to be found in all bodies; and apart from there the only things which we perceive by our senses as being located outside us are light, color, smell, taste, sound and tactile qualities. And I have just demonstrated that these are nothing else in the objects – or at least we cannot apprehend them as being anything else – but certain dispositions depending on size, shape, and motion. <So that the entire visible world, in so far as it is simply visible or perceivable by the senses, contains nothing apart from the things I have given an account of here>.[65]

Even more specifically, Descartes himself presented his theory of *vision* as the exemplary specimen and testing ground of his account: it is not indeed out of chance that the first sensibles mentioned in the passage above (as in many other) are the *visual* sensibles – light and color, namely – and in the already quoted passage from the *Sixth Set of Replies* Descartes expressly

[65] *Principia* IV 199; AT VIII-1 323, 3-14; CSM I 285-86. The sentences in angle brackets is taken from the French authorized translation; cf. AT IX-2 317-18. On the crucial importance of the concept of enumeration in Descartes' philosophy, see Theo Verbeek, "*Enumeratio* in Descartes' *Regulæ ad directionem ingenii*: From *ingenium* to *intellectus*" (forthcoming).

refers his readers to "the explanation of vision…already given in the *Dioptrics*" as a model of what he took himself "to be capable of accomplishing with regard to the remaining senses", referring his objectors to the general theory of perception we was to present in the *Principles*.[66] The next chapters show that vision theory played a truly extraordinary role (both historically and systematically) for Descartes' argument that bodies are nothing but extended substances.

[66] *Responsiones* VI; AT VII 435; CSM II 293*.

[§§18-27] The 'Natural Philosophical' Argument

Descartes took himself to have establish, thanks to his 'first philosophy', that the essence of bodies consists in extension. As the previous chapters were intended to show, Descartes however thought that his 'first philosophy' could not establish by itself whether bodies are *nothing but* extended substances or not. That is to say, given Descartes' understanding of the Scholastic theory of sensory qualities and substantial forms, whether to the three-dimensional matter which constitutes bodies is also attached a non-corporeal substance. Although Descartes though he had disproven on purely metaphysical grounds hylomorphism, his dualism did not in fact commit him to the claim that corporeal and non-corporeal substances could not in principle interact and constitute together a unity (at least of sorts). Descartes, to the contrary, argued that this was as a matter of fact the case with the human being, which for Descartes is indeed "made up" of a mind and a body. As pointed out in the previous chapter, late Scholastics were indeed already conceiving of matter and form as (at least partly) independent entities, for how much only Descartes made the final step to explicitly re-construe the relation between them in terms of a relation between two substances. The question whether bodies, besides being extended, have substantial forms and sensible qualities was therefore according to Descartes to be reformulated in these terms: are there *non-corporeal entities* (understood on the model of the "thinking thing") *attached* to the three-dimensional extension that constitute these bodies, or do these "extended things" exist by their own? Descartes took indeed himself to have established that "extended things" are in fact "substances", which on a par with "thinking things" can in principle subsist perfectly on their own, independently of anything else (God's ordinary concourse aside, which according to Descartes *any* finite substance qua finite requires in order to be brought and be kept into being). What Descartes thought to have proven though his 'first philosophy' was indeed only that "there *can* be *some* bodies which do not think"[1] and therefore, more in general, that there can be "extended things" to which no non-corporeal substances are attached. Which ones exactly, though? And, accordingly, could it be proven that some other bodies do in fact think?

The answer to these questions fell according to Descartes outside the purview of 'first philosophy', which could only instruct how to properly conceive of the relation between corporeal and non-corporeal entities *in general*. In order to figure out to which corporeal

[1] *Responsiones* VI; AT VII 444, 2-10; CSM II 299* (emphases added).

substances (if any, beside the meditator's body) happened to be attached a non-corporeal one, Descartes thought that one had indeed to resort to empirical researches concerning the specific "extended thing" at stake. By his 'natural philosophy' Descartes aimed indeed at determining whether the entire behavior and all the features of a certain body could be explained by appealing to anything but extension and its modes (first of all the figure and motion of the particles of which this body is composed) or, to the contrary it was necessary to posit an additional principle of action (a mind) in order to account for at least some of them.

The current part of the work is accordingly structured in two parts: a first one (§§18-20) presenting Descartes' argument *in favor of* the existence of some non-corporeal substances attached to some corporeal ones – the ones which speak, namely. The second part (§§21-27) expounds on the other hand Descartes' argument *against* positing any non-corporeal entities in all remaining cases, thereby leaving no doubt that for Descartes the questions just presented can (and do in fact) receive different answers according to the different bodies one is specifically dealing with. According to Descartes, only language – and a highly peculiar adaptive behavior – can in fact be taken to provide a positive piece of evidence that to the body of the "two-footed animal without feathers" is in fact united a mind (something that each human being knows to be the case as far as he himself is concerned simply by introspection, but which remains of course to be determined from the third-person perspective for all others). As far as all bodies other than humans are concerned, Descartes thought that there were on the other hand no reasons to introduce any like a non-corporeal principle of action. According to Descartes this was not only the case with the (alleged) minds of non-human animals, but with all the substantial forms of the Aristotelian tradition. And not only with the substantial forms, but also with all "sensible qualities" – i.e. with the bodies' being hot or cold, colored, and so forth.

But how exactly did Descartes intend his argument against these Scholastic entities to work? The next chapters argue that Descartes based his claim that non-human bodies are nothing but extended substances with no non-corporeal additional entities attached on an argument for the best explanation grounded on metaphysical parsimony. On a razor, namely. The next chapters provide evidence that this is in fact the case for both Descartes' argument against non-human minds and his argument against sensory qualities. Whereas according to Descartes 'first philosophy' could positively establish that the essence of bodies consists in extension, 'natural philosophy' could indeed only prove that there were no reasons to think of them otherwise, as anything more than extended things, with the only notable exception of the meditator and of his fellows – *viz.* with the exception of all "animals with λόγος".

[§§18-20] Arguments *for*: The Case of Other Minds

"Herr, täuscht Euch nicht. Denkt an die Kraniche im Flug.
In Reih und Glied, soldatisch streng, ziehn sie dahin.
Denkt an Euklid, und seht den Wabenbau der Bienen".
"Das gräbt und baut, und doch ist keines wirklich klug.
Kein Maulwurf sinnt. Kein Biber sagt sich stolz: Ich bin.
Kein Reh, zum bösen Menschenspiel, macht gute Miene.
Analphabet ist jedes Tier. Es kennt sie nicht,
Die Worte und die Zeichen, die uns lesen helfen
Im Buch der Welt. Ein Mensch, auch wenn er niemals spricht,
Weiß, was gemeint ist mit dem Motto dort in Delphi.
Erkenn dich selbst!"

Durs Grünbein, *Vom Schnee oder Descartes in Deutschland*

The section investigates Descartes' argument for the existence of other minds, and explain why he restricted this claim to human animals alone. §18 makes clear why the existence of other minds presents a problem at all for Descartes and how he intended to deal with this problem. The gist of Descartes solution, as shown in §20, is to argue that some animals are capable of performing actions (most noticeably of all, the action of speaking) that cannot be accounted for by merely appealing to the laws of motion, and therefore demand to posit an additional non-material principle of action – i.e. a mind – guiding the behavior of these living beings. §19 shows that Descartes' understanding of the laws of nature did not in fact rule out the *metaphysical possibility* that entities other than God could act upon the material world (the laws of nature being construed by Descartes as the self-prescribed principles according to which God is constantly acting on bodies). "The ordinary course of Nature" admits in fact for Descartes some "exceptions", so that he thought that it could be positively *demonstrated* (on the basis of these experienced "exceptions") that the meditator is not the only *res cogitans* in the world, whereas later full-blown "determinists" explicitly argued that this could only be *supposed* to be the case *on the basis of an analogical reasoning* (since in their views "*le cours ordinaire de la Nature" left no room for "exceptions" – miracles aside, in case).* According to Descartes, to all animal bodies capable of speaking *must* indeed be credited a mind responsible for these utterances, since being able to speak exceeds the capabilities of any mechanism. For Descartes, human animals are however the only beings to meet these criteria. For Descartes – and this is a truly crucial, albeit mostly

unrecognized, point – this does not however entail by itself that non-human animals *do not have* a mind, but only that it *cannot be established* whether this is the case: for Descartes, no one can in fact "reach into their hearts", so that is only on the basis of their behavior that the issue here at stake can be addressed. However, since (so claims Descartes) it is possible to account for all actions performed by non-human animals by appealing to nothing but mechanical principles – i.e., to nothing but the shape and motion of some pieces of extended matter – the claim that non-human animals too have a mind is *unwarranted*. In the absence of any reason to the contrary, it must therefore be concluded that animals are machines – *viz.* that they are nothing but extended bodies moving according to nothing but the laws of motion. Whereas Descartes thinks to be in possession of a direct and positive argument *for* the existence of other minds in the case of human beings, his argument *against* an analogous claim for non-human animals is indeed to be understood as an *argument from parsimony*. As a matter of fact, we are confronted here with the first instance of Descartes' razor and with his general strategy to rule out real qualities such as color and the like from the material world (which, as pointed out in the previous chapter, Descartes conceived as non-corporeal *substances* on the model of the mind). Besides its intrinsic importance, Descartes' argument for and against the existence of other minds is therefore also to be regarded as an important specimen of the general strategy of Descartes' natural philosophy; hence its importance for the present work

§18. "Cette vanité de vouloir estre solipse"

"*Ego* cogito, ergo sum" – "*I* think, therefore *I* exist": this the first piece of truth whereby the meditator thinks himself to be able to oppose the doubts he himself had raised about the existence of all things.[1] The meditator becomes thereby aware of his uniqueness, which he acknowledges in all of its importance by stating out loud his "ego" right at the beginning of the sentence, rather than passing it over silence as Latin is used to do with subjects. As a matter of fact, it is largely because of a trend that started with the *Meditations* that we speak today of an "I" as such, in absolute terms.[2] Starting from his own existence, at the end of the *Meditations* this "I" will also claim to have proven that there is a God and that there are bodies it (the "I") can exist independently of, while yet happening to be united with one of them, which the "I" accordingly claims as its own (*corpus meum*).[3] In this brave new world, this "I" is yet alone. This solipsism is not an accidental outcome of the first-person perspective from which the *Meditations* proceed, but the result of doubting the existence of all beings – human beings included – a universal doubt which is indeed for Descartes the starting point of any rigorous philosophical enquiry. Accordingly, Descartes thought that the thread of solipsism had to be faced even while presenting his philosophy in the form of a dialogue, however difficult it was to imagine a dialogue with just one interlocutor. After a little while, each interlocutor of the *Search after truth* started indeed suspecting that he could have been speaking by himself all the way through or, at least, started to entertain this possibility:

> I shall be uncertain not only about whether you are in the world and whether there is an earth or a sun; but… even whether I am speaking to you and you are speaking to me. In short, I shall doubt everything.[4]

If Descartes' search for truth can legitimately be regarded as dialectic, this is indeed not in Plato's sense: of the many Socratic dialogues, what interested Descartes most was in fact Socrates' listening to his own *génie*.[5] In the very same *Meditation* where the meditator came to

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[1] *Meditationes* II; AT VII 25, 11-13: "hoc pronuntiatum, *Ego sum, ego existo*, quoties a me profertur, vel mente concipitur, necessario esse verum".

[2] On the topic see Vincent Carraud, *L'invention du moi* (Paris: Presses Universitaires de France 2010).

[3] *Meditationes* I; AT VII 18, 24-25. *Conversation with Burman*; AT V 165.

[4] *Recherche de la vérité*; AT X 514, 11-15; CSM II 409.

[5] Cf. To Elisabeth, November 1646; AT IV 530. Descartes is reported to have written a booklet, unfortunately lost, on the topic, entitled *De Deo Socratis*; cf. Adrien Baillet, *Vie de Monsieur Descartes* (Paris: La Table Ronde 1946),

know of his existence, he realized that he could not in fact say for sure whether the companions and fellow beings around him were in fact true human beings or puppets dressed in vests and hats.[6] In Descartes' philosophy the meditating subject is indeed left completely to himself, and so right from the beginning: if his parents are mentioned this is only to point out that they cannot have been the real cause of his existence.[7]

Such a strict first-person perspective as the starting point of the philosophical enquiry resulted in a refusal of any argument "from universal agreement". Contrary to what Reid claimed in a recent and otherwise well-informed article, Descartes did not "simply ignore" the argument *ex consensu gentium*, but was probably among the very firsts (together with Gassendi) to criticize Herbert of Cherbury for taking world-wide consent as a "the rule for his truths":[8]

> The author takes universal consent as the rule for his truths.[9] As for me, I have no rule for mine except the natural light (*lumière naturelle*), which to a certain extent conforms to that, since all men have the same natural light, so that they should all have the same notions. It is very different, though, since almost no one makes a proper use of this light. From which it follows that most people – all the ones we are acquainted with, for example – may agree, yes indeed, but upon the same error. Furthermore, there are plenty of things that can be discovered thanks to this natural light on which nobody, so far, has reflected.[10]

II 408. Cf. Jean Deprun, "Descartes & le *génie* de Socrate" in Jean-Luc Marion ed., *La Passion de la Raison: Hommage à Ferdinand Alquié* (Paris: Presses Universitaires de France 1983), 143-58.

[6] *Meditationes* II; AT VII 32, 4-10.

[7] *Meditationes* III; AT VII 50, 25 - 51, 1. Cf. To Clerselier, 23 April 1649; AT V 357; CSM 378*: "even though everything we are accustomed to believe of our parents is perhaps true, that is, that they begat our bodies, still I cannot imagine that they made me, in so far as I consider myself only as a thing which thinks, because I see no relation between the physical act by which I am accustomed to believe they begat me, and the production of a substance which thinks".

[8] Jasper Reid, "The Common Consent Argument from Herbert to Hume", *Journal of the History of Philosophy* 53/3 (2015): 401-33. On the history of universal consent as a criterion for *truth*, see Klaus Oehler, "Der *consensus omnium* als Kriterium der Wahrheit in der antiken Philosophie und der Patristik" in Id., *Antike Philosophie und byzantinische Mittelalter: Aufsätze zur Geschichte des griechischen Denkens* (München: Frischeisen-Köhler 1969).

[9] Cf. Herbert of Cherbury, *De Veritate,* 39: "summa igitur veritatis norma, erit consensus universalis… [one should therefore] communes illas notitias seligere, &… tamquam veritates indubias, reponere". Some other difficulties founded by Descartes with Herbert of Cherbury's conception of innateness have already been discussed in §3, to which the reader is referred.

[10] To Mersenne, 16 October 1639; AT II 597-98; CSMK 139*. Mersenne translated Herbert of Cherbury's *De Veritate* in 1639 and sent his French version to Descartes. A Latin copy of the same book had already been sent to Descartes one year before, asking for a comment; Descartes praised it in quite vague terms; see To Johann Wilhelm Eding (for Hartlib), April or May 1638; AT II NA 658. Cf. To Mersenne, 19 June 1639; AT II 566. To Mersenne

In so doing, Descartes was anticipating Locke, whose *Essay concerning Human Understanding* (1689) famously took Herbert of Cherbury's *De Veritate* (1624) as his polemical target on the issue of innatism.[11] It is indeed the very argumentative strategy of Descartes' philosophy to rule out from the outset any claim *ex consensu omnium*. Universal consent cannot possibly be an argument in Descartes' work because the meditating subject is always all by himself: *solus secedo*, as he claims he will proceed at the very beginning of the *First Meditation*.[12]

Leibniz once reproachfully remarked that "Des Cartes, tout grand homme qu'il estoit, avoit cette vanité de vouloir estre solipse".[13] There is no egotism in Descartes' method, though. (Of course, what was going on in Descartes' own mind is another matter, but is also beside the point.) Descartes' meditating subject is not a disguised René: he – she – stands for everyone. Indeed, since all human beings are equally born with the same capacity to tell the true from the false (what Descartes calls the "raison naturelle", or *ingenium*), it follows that, *in principle*, no one

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27 August 1639; AT II 570. To Mersenne, 25 December 1639; AT II 629. On the relationship between Herbert of Cherbury's *De Veritate* and Descartes' philosophy, see Ernst Cassirer, "Descartes' Wahrheitsbegriff", *Theoria* 3 (1937): 161-87.

[11] John Locke, *An Essay concerning Human Understanding* I iii 15; ed. Nidditch, 77. The first 1624 Paris edition was followed by two revised London editions, dated 1633 and 1645 (the latter including also Herbert's *De causis errorum* and *De religione laici).* In §3 it has in fact already been shown that for Descartes innate ideas are *not* always present to the mind, being up to the subject to decide *when* to think of them, of opposed to *how* to conceive of these notions: if their representative content is given, the occurrence in the stream of thoughts of innate ideas remains indeed for Descartes to be determined by the meditator, who could accordingly happen to spend all of his existence without ever thinking of a supremely perfect being: "Although it is not necessary that I ever light upon any thought of God (*non necesse sit ut incidam unquam in ullam de Deo cogitationem*), whenever I do choose to think of the first and supreme being, and draw forth the idea of God from the treasure house of my mind, it is necessary that I attribute all perfections to him"; *Meditationes* V; AT VII 67, 19-24; CSM II 46-47*. Cf. To Hyperaspistes, August 1641; AT III AT 430. If for an idea to count as innate it is not required that this idea is present to the mind – to any mind – at *all* times, it follows that ideas of this sort do not even need to be present in all cultures – to *all* minds. Therefore, since it remains up to the subject to bring about these ideas *or not*, any traditional argument for innatism based on universal consent is ruled out. Descartes, consistently, never mentioned world-wide diffusion as a criterion for an idea to count as innate. By the same token, he did not feel challenged by the criticism of various Paris-based scientists, who drew Descartes' attention to the fact that some newly-discovered populations from all around the world had no clue of any god-like being; cf. *Objectiones* II; AT VII 124, 9-12. Universal consent, in Descartes' mind, is indeed neither a necessary nor a sufficient criterion for innatism. Nor even for truth, actually.

[12] *Meditationes* I; AT VII 18, 1-2 (the opening paragraph of the work).

[13] Leibniz, *Mémorie pour les personnes éclairées & de bonne intention* §23 in Foucher de Careil ed., *Lettres & Opuscules inédits de Leibniz* (Paris: Lagrange 1854), 289.

needs anyone else in order to establish whether something is the case or not.[14] If people's views come to diverge, for Descartes this is indeed due to nothing but a defect in method, since "it is not enough to have a sound mind: the main thing is to apply it properly".[15] According to Descartes, therefore, rational beings do not need to (and they actually do not) agree on the first truths. Far from being a criterion for anything, universal consent can only operate as a regulative ideal.

While Herbert of Cherbury and many other his contemporaries took universal consent as "the rule for his truths", for Descartes it remained to be established in the very first place whether it is true or not that there are other human beings at all or, at least, whether it can be *proven* that is the case. On an even more general level, at the outset of the *Meditations* the meditator is in the dark whether there are any other non-corporeal finite substances or whether he is the only being of such a nature in the entire world. The *Meditations* could simply take no stance on the issue, not even a negative one. If the first readers of the *Meditations* took their author to have intended to establish that "there are bodies which do not think" (*esse corpore quæ non cogitant*), Descartes immediately pointed out that this was not the case: in his eyes, what he had proven in the six *Meditations* was indeed only that "there *can* be *some* bodies which do not think" (*quædam corpora sine cogitatione esse possent*).[16] Which ones exactly – and, in the reverse, which came on the other hand *cum cogitatione* – was in fact for Descartes to be determined case by case, by considering one after the other each of these bodies in order to ascertain whether there were in fact reasons to ascribe to them a non-corporeal principle of action on the model of the mind.[17]

Before studying which behaviors of bodies are for Descartes to be explained by a non-corporeal substance attached to the *corporis machinamentum* under our eyes, it is however necessary to enter a bit into Descartes' theory of how this "machine" would be intended to work.[18] Not

[14] *Discours* VI; AT VI 77, 28. Cf. Daniel Garber, ""La chose du monde la mieux partagée": Descartes and *Ingenium*" (forthcoming).

[15] *Discours* I; AT VI 2, 12-13; CSM I 111*.

[16] *Responsiones* VI; AT VII 444, 2-10; CSM II 299* (emphases added).

[17] The problem of other minds is not born with Descartes, nor will it end with him; cf. Anita Avramides, *Other Minds* (London: Routledge 2001). The problem, still, is especially pressing for the philosophy of the *Meditations* and for any thinkers working from the first-person perspective. Husserl, accordingly, could not think of any better title than *Cartesianische Meditationen* for the work where he presented his own solution to the problem.

[18] Cf. *Meditationes* V; AT VII 84, 19-22; CSM II 58: "I might consider the body of a man as a kind of machine (*machinamentum quoddam*) equipped with and made up of bones, nerves, muscles, veins, blood and skin in such a way that, even if there were no mind in it, it would still perform all the same movements as it now does in those

just the animal machine, though, but any extended substance in general, which taken together constitute the big machine of the universe. Descartes thought that his *prima philosophia* could indeed not only establish that material substances are extended, and figured, and in motion or at rest in relation to each other, but also state the *laws* according to which bodies move and interact with each other, that Descartes argued to be directly deducible from God's immutability (and, thus, non-empirical). As shown in the next chapter, Descartes' understanding of the laws of nature did not however rule out the possibility that *finite* minds too (as opposed to God's) could act upon bodies. Descartes maintained that he could thus legitimately defend a form of determinism while making room for the possibility that these laws could be unable to account for the behavior of *all* bodies (which ones exactly – if any – would have to be determined on an empirical basis). It was precisely by reason of these physically unaccountable behaviors that Descartes claimed that it could be *positively established* (as opposed to being assumed on the basis of a merely analogical reasoning) that *some* of these bodies – as a matter of fact, the bodies of all "two-footed animal without feathers" – are maneuvered by a mind they are united to, whereas as regards all feathered, crawling and four-legged beings there is no reason to believe that they are nothing more than machines of admirable sophistications, all of whose movements are ultimately driven by the laws of motions alone.

cases where movement is not under the control of the will or, consequently, of the mind". *Ibid.* AT VII 85, 5-6. See also To More, 5 February 1649; AT V 277.

§19. The "ordinary course of Nature" and its "exceptions"

Descartes is sometimes credited for being the first to work out the full-fledged concept of a natural law. Already Bacon and Galileo spoke of similar 'laws', which in their account did not, however, apply to all bodies, but were differently specified for different classes of object or, as is the case for Galileo's law of falling bodies, seems to have been taken to hold only in the sublunary world.[1] It is yet precisely this universal validity of overarching principles to make of Descartes' Principes de la Nature – as Descartes also calls his leges naturæ[2] – physical laws in the Modern (largely post-Cartesian) understanding of the term.

The proper physical significance of Descartes' natural laws has been much debated in the literature, so that it would require many pages to even simply touch upon the main readings of the laws of motion spelled out by Descartes in *The World* (1633) and, later on, in the *Principles* (1644), and even more to evaluate and explain the subtle differences between these two works.[3] The argumentative strategy followed by Descartes in deducing these laws, thorny as is in its specifics, is nonetheless quite clear in its main lines, and permits to illuminate Descartes' ontological conception of the leges naturæ. Descartes argues that we can deduce both a law of inertia – or, more faithful to Descartes' statements, of perseverance – and the conservation on the overall quantity of motion of the material worlds from God's immutability: since God is immutable and simple (immutability and simplicity being perfections, and God being the most perfect being), his operations too must indeed be both simple and immutable. Descartes thus argues that God conserves the direction in which a body is moving at a given instant, as he is said to conserve, in case a body happens to hit another one, the quantity of motion of the two taken together (the quantity of motion corresponding to the mass of a body – its quantity of matter – times its velocity).[4] Such a deduction is without doubt problematic, and rests on a few very strong premises about the relation between God and the material world. According to

[1] The issue is as fascinating as complex, so that it will be impossible to address here as it would deserve. For a first orientation in the immense literature (and an argument in defense of the claims just made), see Daniel Garber, "God, Laws, and the Order of Nature: Descartes and Leibniz, Hobbes and Spinoza" in Eric Watkins ed., *The Divine Order, the Human Order, and the Order of Nature: Historical Perspectives* (Oxford: Oxford University Press 2013), 45-66.

[2] *Principes*, Preface; AT IX-2 16, 20-21.

[3] *For a valuable account of the issue, with a good discussion of the previous literature on the topic, see Daniel Garber, Descartes' Metaphysical Physics (Chicago - London: University of Chicago Press 1992).*

[4] *Cf. Principia II 37; AT VIII-1 62, 6-7: "Atque ex hac eâdem immutabilitate Dei, regulæ quædam sive leges naturæ cognosci possunt"; Principia II 39; AT VIII-1 63, 26-29: "Causa hijus regulæ eadem est quæ præcedentis, nempe immutabilitas & simplicitas operationis, per quam Deus motum in materiâ conservat".*

Descartes, God has in fact to continuously recreate the entire world, which would otherwise sink into nothingness. Descartes argues that the creation of the world and its conservation through time differ sola ratione, insisting that the power required for both actions is one and the same.[5] Descartes, however, also claims that matter, left to itself, would have to always remain at rest, an endless field enduring unchanged.[6] Besides the continuous conservation of matter, Descartes entrusts therefore his God with putting it into motion, at first, before having to preserve at any time the quantity of motion he had initially decided to lend to this matter (a few complications aside, to be discussed in what follows). Contrary to Pascal's sardonic remark, Descartes' God does not indeed "flick" the world to leave the scene immediately thereafter: his action is indeed way more than a once-upon-a-time chiquenade.[7] Descartes' laws of nature are indeed intended to describe precisely God's constant way of operating upon the world. It is precisely because Descartes understands of physical laws in this way that he considers them to be deducible (whatever this deduction actually amounts to) from the simple concept of a simple and immutable God.

Given Descartes' understanding of the laws of nature, it clearly follows that if God were the only agent in the world, these laws would never be violated, since any violations would imply an inconstancy on God's part, thereby blemishing the most perfect being. Descartes, it must be acknowledged, explicitly mentions miracles as a straightforward counterexample to this theory. In line with received views, Descartes conceives of miracles, however, as lying beyond the scope of the "natural light" of human reason and, accordingly, accepts them as a brute fact without ever discussing how physical laws could make room for them and, even more importantly, how they could be compatible with God's alleged immutability. According to Descartes, Christians can only believe by faith that these miraculous changes occurred "without any change in the creator himself".[8]

Besides miracles, which are supposed to be believed because of Revelation, Descartes acknowledged some other changes in the quantity of motion of the world, which would be testified by a "clear and immediate experience" and which do not appear to be caused (not

[5] Cf. *Responsiones* V; AT VII 370, 6-12. *Meditationes* V; AT VII 49, 9-10: "conservationem solâ ratione a creatione differre".

[6] Descartes defended this theory of matter throughout his entire philosophical reflection; see, among the letters, To Villebressieu, summer 1631; AT I 261; To More, August 1649; AT V 404.

[7] *Cf. Blaise Pascal, Pensée, Brunschvicg fr. 77: "Je ne puis pardoner à Descartes; il voudrait bien, dans toute sa philosophie, se pouvoir passer de Dieu, mais il n'a pu s'empêcher de lui faire donner une chiquenade pour lettre le monde en mouvement; après cela il n'a plus que faire de Dieu".*

[8] *Principia II 36; AT VIII-1 61, 19-29 (to be analyzed immediately below).*

directly, at least) by God. In presenting his deduction of physical laws for the first time, Descartes in fact warned his reader that for the time being he would have assumed that neither God nor any other minds would have disturbed "le cours ordinaire de la Nature", so to be able to provide a purely rational a priori account of how bodies move and behave:

> In order to rule out exceptions which prevent us [from describing a priori how bodies behave], we will add to our assumptions, if it pleases you, that God will never produce a miracle and that the Intelligences – or rational Souls – which we might assume below in the treatise, will not disrupt the ordinary course of Nature in any way.[9]

Some ten years later, in the Principles, Descartes would have put forward a simplifying assumption along the very same lines:

> We also understand that God is perfect not only because he is, in himself, immutable but, moreover, in that he operates in as constant and immutable a way as possible. Therefore, leaving aside the changes that evident experience or divine revelation make certain, which we either perceive or we believe to happen without any change in the creator himself, we ought not to suppose any other changes in God's works, lest from that we can maargue for an inconstancy in him.[10]

Let us follow Descartes and leave aside Revelation, to focus on the changes that finite minds like us are said to be able to experience by themselves. As Descartes makes clear in some other writings of approximately the same period, the evidens experientia he is referring to here is the certissima et evidentissima experientia "that the mind, which is incorporeal, can set the body in motion", which everyone of us is said to make every time we raise an arm[11] (how everyone of

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[9] *Le Monde; AT XI 48: "Et afin qu'il n'y ait point d'exception qui en empêche, nous ajouterons, s'il vous plaît, à nos suppositions que Dieu n'y fera jamais aucun miracle & que les intelligences, ou les âmes raisonnables, que nous y pourrons supposer ci-après, n'y troubleront en aucune façon le cours ordinaire de la Nature" (emphasis added). In order to facilitare the exposition and given Descartes' lack of interest in the topic, in what follows "angelic" intelligences will not be considered (in his Conversation with Burman Descartes went actually so far as to make fun of Aquinas for his speculations on the subject, which had earned Aquinas the title of "Doctor Angelicus").*

[10] *Principia II 36; AT VIII-1 61, 19-29: "Intelligimus etiam perfectiones esse in Deo, non solùm quòd in se ipso sit immutabilis, sed etiam quòd modo quàm maxime immutabili operetur: adeò ut, iis mutationibus exceptis, quas evidens experientia vel divina revelatio certas reddit, quasque sine ullâ in creatore mutatione fieri percipimus aut credimus, nullas alias in ejus operibus supponere debeamus, ne qua inde inconstantia in ipso arguatur" (emphasis added).*

[11] To Arnauld, 29 July 1648; AT V 222; K 358: "That the mind, which is incorporeal, can set the body in motion is something which is shown to us not by any reasoning or comparison with other matters, but by the surest and plainest everyday experience (*sed certissima & evidentissima experientia quotidie nobis ostendit*). It is one of those self-

us can come to know – if ever – that the bodies similar to our own that we see around ourselves are attached to minds that are making experiences analogous to our own is a non-trivial issue, to be discussed in the chapter that follows: for the time being let us nonetheless concede to Descartes to speak of "we" human beings).

In the world of Descartes, amidst the swarm of particles hitting each other according to the laws of motion, there is in fact one highly peculiar little body, which is said to be subject not only to physical laws, but to bridge the gap to a completely different realm. Descartes thinks that the brain (and, more specifically, the infamous pineal gland) is not in fact only responsive to physical changes such as the stimulation coming from the external sense-organs, but can be somehow set into motion by the mind. According to Descartes, the decision to raise an arm in fact brings about a change in the brain, which results in a change in the limbs' disposition. The intervention of the mind on the body, however, is not confined to these eye-catching actions that can be ascertained from a third-person-perspective, but permeates a good portion of its inner theoretical, creative, and emotional life. To resist a passion, for example, the mind has to raise the opposite one, which happens, physiologically, by actively modifying the current brain state (more specifically, according to Descartes, thanks to a different movement impressed to the pineal gland by the mind).[12] The mind, moreover, does not form a material idea only for practical purposes: in Descartes' view the solution to many mathematical problems is greatly facilitated by the drawing of a diagram onto the imagination and, hence, on paper. Descartes' entire theory of the imagination is actually based precisely on the thesis that the mind can act upon the body so as to modify it: as already pointed out in §6, to distinguish my pure thinking of a triangle from my voluntary imagining of it is indeed for Descartes that in the former case the mind remains by itself, as it were, whereas in the latter the cognitive power is said to apply itself to a brain trace brought about by the mind itself. Or, to cast the issue in the pictorial model Descartes sometimes avails himself of, that the mind itself has decided to "draw" (and the same of course holds true for any voluntary imaginative act, not only for the ones in service of mathematics).

The "exceptions" Descartes had to bracket in order for his physics to get off the ground are indeed way more numerous that one could think at first glance, so that his entire program of a "mechanical philosophy" (as it was later to be called) seems to run into a disaster. As shown

evident things which we only make obscure when we try to explain them in terms of other things". The passage has already been discussed in §17.

[12] Descartes' most clear formulation of this point is possibly to be read in *Passions* I 47; AT XI 364-66. Cf. *Passions* I 41-43; AT XI 359-361.

by a leading philosopher of science like Earman, while pointing out some difficulties of Einstein's special relativity, any "partially deterministic world" seems indeed to contain in itself the seeds of its own destruction. If Einstein was to work out a general theory of relativity also to cope with these unintended difficulties, Descartes on the other hand expressly made room for anomalies in his World. How are we thus to conceive of Descartes' world, then, provided this is conceivable at all?

> Determinism needn't be an all-or-nothing affair. A world may be *partially deterministic*, deterministic with respect to some magnitudes (agreement on the values of which at any time forces agreement at other times) but not with respect to others. But while such a bifurcation is imaginable, it can produce tension. Try, for example, to imagine that with respect to the magnitudes which characterize the ordinary matter of which we and are scientific instruments are composed but not with respect to the magnitudes which characterize the behavior of a free-spirited species of particles, the freeon (say). But either the freeon magnitudes interact with ordinary magnitudes, or not. In the latter case that freeon are scientifically suspected entities since, as far as science can teach us, they are unknowable ghosts in the deterministic machine. In the former case it is hard to see how, *without a cosmic conspiracy*, the partial determinism for the ordinary magnitudes can be maintained, since otherwise the non-deterministic evolution of the freeon would infect the evolution of ordinary matter.[13]

The pineal gland is exactly one such a particle, Descartes' freeon. Contrary to what happened with the Epicurean atoms implicitly evoked by Earman, the movements of the pineal gland are not random ("free-spirited"): although not ruled by the laws of physics, according to Descartes, these movements are in fact still dictated by something – namely, by the mind. In so doing, Descartes claims that the mind directly *experiences* itself as the free cause of its decision, whereas the *clinamen* appears to have been introduced by the Epicureans as a stochastic event, whose existence was to be *postulated* (as opposed to experienced) as a *condition of possibility* of human free agency.[14]

The comparison of Descartes' theory with the atomist one, besides helping to address the issue on a purely conceptual level, might be of some historical importance, if not for Descartes, at least for the first reception of his theory. Whereas Descartes affirmed that the mind's intervention in the physical world altered the overall *quantity of motion*, Clerselier – and, after

[13] John Earman, *A Primer on Determinism* (Dordrecht: Reidel 1986), 13-14 (the second emphasis is added).

[14] Even though it is hard to figure out (at least from the extant texts), how Atomists expected to be able to move from a few not physically determined events scattered throughout the world to an autonomous principle of determination intrinsic to the subject.

him, virtually all Cartesians – argued that the mind can only modify the *direction* of a motion or, more precisely, what Descartes calls its *determinatio*.[15] According to Descartes' *metaphysics* the quantity of motion and its *determinatio* are indeed on a par, both being modes of an extended substance. However, while Descartes has a pretty good *physical* theory about the former, he does not likewise succeed to manage the latter (scholars, actually, are still debating the actual meaning of the concept). Descartes does indeed deduce the laws of collision from the principle that the quantity of motion must be preserved, whilst the directions taken by the colliding bodies after the shock are not determined in any such a way. Descartes, to put it briefly, lacks the parallelogram rule of vector addition, for the very simple reason that in his physics velocity – which is a function of the quantity of motion – is not a vector magnitude (nor is it the quantity of matter, of course).[16] The Occasionalists, who intended to promote a fully deterministic concept of the world (miracles aside) found therefore an easy was out by following Clerselier in confining the actions of the mind on the body to a change in the direction of motion – more in particular, of the direction of the spirits issued from the pineal gland. Given Descartes' physics, this would indeed be a fully deterministic world, since direction is not supposed to be conserved (hence Leibniz' later criticism that Descartes' physics is underdetermined).

In order to make sense of these blind spots in Descartes' philosophy and to pursue their own philosophical agenda, it is indeed possible that at least some of the first Cartesians were consciously trying to rework the concept of a *clinamen*, to which the 17th champion of atomism had already implicitly referred in discussing a possible solution to the mind-body interaction. After having discussed many difficulties of Descartes' theory according to which the soul (in spite of its being unextended) can still act upon an extended body, Gassendi proposed a last way out, which would be open to Descartes in case he could have been ready to admit that the mind is at least able to "*direct* the movements of the spirits", already set in motion by some previous collision with another body. As a matter of fact, the *clinamen* corresponds exactly to such a change in direction (not in the quantity of motion), were the swerve intended as the result of an action of the mind rather than as a random physical event. In his *Objections* Gassendi seems indeed to be tentatively proposing something like a middle way between Epicurus and Descartes, and he will come back to the issue while trying to make sense on his own terms of

[15] As beautifully shown by Daniel Garber, "Mind, Body, and the Laws of Nature in Descartes and Leibniz" in Id., *Descartes Embodied*, 133-67, see especially 143-52.

[16] For an articulated defense of this claim see David M. Miller, *Representing Space in the Scientific Revolution* (Cambridge: Cambridge University Press 2014), 147-87.

human agency.[17] Gassendi, it goes without saying, rejected in his *Objections* also this last alternative, contending that

> you [Descartes] must explain how this directing of movement (*directio*) can occur without some effort – and, therefore, motion – on your part. How can there be effort directed against anything, or motion set up in it, unless there is mutual contact between what moves and what is moved? And how can there be contact without a body when, as is transparent clear by the natural light "naught apart from body, can touch of yet be touched"?[18]

Descartes dismissed at the stroke of a pen Gassendi's criticism, which he accused of being grounded on the assumption "that, since the soul and the body are two different substances of different natures, this prevent them to act upon each other", which Descartes claimed yet to be unproven and unprovable (being false).[19] Cartesians sided with their master, obviously enough, but they could not ignore the fact that a proper solution to the question was still missing, nor could they content themselves with Descartes' claim that the problem was unaccountable as such, so that all one could do was to come to terms with it and carry on. Most of Descartes' followers became convinced that Occasionalism, ruling out as it was any mind-body interaction, could have provided an answer. Such a change in the notion of causality, notwithstanding its undeniable significance, is, however, not enough by itself to settle the matter. From a metaphysical point of view, the agency of the mind can of course be accounted for in many different ways, and it is indeed still open for debate whether Descartes was a full interactionist or an Occasionalist of sorts. And yet, were Descartes an Occasionalist through and through, in this case too his physics would not turn itself into a fully deterministic one: in this case too

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[17] On the topic, see Lisa T. Sarasohn, *Gassendi's Ethics: Freedom in a Mechanistic Universe* (Ithaca, NY: Cornell University Press 1996).

[18] *Objectiones* V; AT VII 341 18-27; CSM II 237: "Nam, si dicas illos per se moveri, ac te solummodo dirigere ipsorum motum, memento te alicubi *negasse moveri corpus per se*, ut proinde inferri possit te esse motûs illius causam. Ac deinde explica nobis, quomodo talis directio sine aliquâ tuî contentione atque adeo motione esse valeat? Quomodo contentio in rem aliquam, & motio illius, sine contactu mutuo moventis & mobilis? Quomodo contactus sine corpore, quando (ut lumine naturali est adeo perspicuum) tangere nec tangi sine corpus nulla potest res". Any possible reference to the *clinamen* aside, Gassendi's criticism – as well as Descartes' answer or, better, the admission that there are none – is crucial to understand Descartes' theory of a mind-body interaction.

[19] To Clerselier, 12 January 1646; AT IX-A 213 (S*euant de réponse à un recueil des principales instances faites par Monsieur Gassendi contre le precedente Réponse*): "toute le difficulté qu'elles contiennent ne procede que d'une supposition qui est fausse, & qui ne peut aucunement estre prouvée, à scavoir que, si l'âme & le corps sont deux substances de diverse nature, cela les empesche de pouvoir agir l'une contre l'autre".

Descartes could indeed still contend that not *all* space-time events *follow* from the previous ones *according to the laws of nature* alone, claiming that *some* of these evens happen in fact to *follow* from what is going on in the mind, such as the subject's resolution to raise an arm or – even more remarkably – from the decision, apparently so inconsequential, to imagine a triangle.

The causal closure of the two domains – the physical and the mental – or, even more strongly, the eradication of any proper notion of a cause from them, supplanted by the simpler relation of a succession according to a law, does not indeed decide by itself of determinism. This general thesis would of course require much more space to be fully argued and surpass by large the scope of this work, but the line of reasoning sketched above should at least urge some more caution in claiming that the problem of causality and determinism, as well as their history, *have to* proceed hand-in-hand. This would of course be a point of major importance for the historians of philosophy and science of the Early Modern Age, since the notion of cause underwent many critical changes during the two decades after Descartes' death, the very same decades in which the modern concept of physical determinism finally raised and gained ground. By telling apart the issue of determinism from the debates about the metaphysics of causation, a history of the former topic could indeed gain in conceptual sharpness and would be able to examine together Descartes and La Forge, Hobbes and Malebranche, Spinoza and Leibniz, despite the conspicuous differences in their theories on causation. This claim should not be pushed too far, of course, since these two problems – causality and determinism – were often approached together by most of these thinkers, but this working hypothesis would at least have the welcome effect not to take for granted a straightforward conceptual relation between the two.

If right, this general approach would entail that Descartes' understanding of the laws of nature has more to tell about the kind of determinism embraced by his physics than all of his disparate claims about causation put together.[20] And this proves indeed to be the case. From Descartes' understanding of the laws of nature as the expressions of God's ordinary actions upon the world (however this "action" would be said to occur), it follows in fact that these laws do not hold for all agents, but only for the infinite immutable one. Descartes' leges naturæ were not indeed *supposed to account for* all changes in bodily motions, but only for what are all instances of body-body interaction, which for Descartes are regulated by nothing but the "laws of

[20] A *full account of Descartes' theory of determinism (not only of his, actually) would of course require examining his theory of modalities and*, in case one intends to stick to Earman's formulation, whether his ontology of res extensæ changing through time can rewritten as an ontology of events (and, if not, how this might affect the issue). As for the present, though, given the topic of the present chapter, only Descartes' concept of a law of nature will be taken into account.

Nature" instituted by God.[21] According to Descartes, God is not indeed the only mind to act upon the world. Although finite, for Descartes human minds too can indeed make a difference and bring about a change in the physical world, as he makes crystal-clear in stating his third (and last) law, the law of collision:

> The third law of nature is this: when a moving body collides with another, if its power of continuing in a straight line is less than the resistance of the other body, it is deflected so that, while the quantity of motion is retained, the direction is altered... All the particular causes of the changes which bodies undergo are covered by this third law – or, at least, all the changes that are corporeal. I am not here enquiring if and how the human or angelic mind has any power to move bodies. I reserve this topic for my book on man (saltem eæ quæ corporeæ sunt; an enim, & qualem, mentis humanæ vel Angelicæ vim habeant corpora movendi, non jam inquirimus, sed ea tractationem de homine reservamus).[22]

Albeit bringing about a change in the world, man cannot therefore be said to ever breach the laws of Nature, since these laws for Descartes state nothing but the manner in which God, and God alone, operates (at least ordinarily). Descartes, indeed, has never spoken of any alleged "violation" of the laws of physics on man's part, but only of a "disruption of the ordinary course of Nature". For Descartes, only *God could in fact violate* these laws (as he would do in operating a miracle), but this is more revealing about the limited scope of the laws of physics than about God's unlimited power. Non-rational events aside, for Descartes the leges naturæ are indeed always in play, but they are not the entire story: if the story of the world is to be told, men too are to be taken into account. *According to Descartes, it is indeed enough for the mind to imagine a triangle to jeopardize the entire course of Nature.* Commenting on the Principles, Henry More raised

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[21] During the Early Modern Age, most of the debates concerning causation revolved precisely around the relation between material substance, laws and God, and largely depended on how robustly one understood of the first two notions from a metaphysical point of view. One could get a glimpse of the sophistication of these theories by simply considering how Descartes' distinction between a "universal and primary" cause (God) and the laws as the "particular and secondary" ones has been interpreted, also in the light of the Scholastic debates on the nature of causation; cf. *Principia* II 36-37; AT VIII-1 61-62. The literature on the topic is immense, and the interpretations very diverse. For some of the most important positions in the debate, see at least *Garber, Descartes' Metaphysical Physics*. Dennis Des Chene. *Physiologia: Natural Philosophy in Late Aristotelian and Cartesian Thought* (Ithaca, NY-London: Cornell University Press 1996). Tad M. Schmaltz, *Descartes on Causation* (Oxford: Oxford University Press 2008). Peter Machamer – James E. McGuire, *Descartes's Changing Mind* (Princeton, NJ: Princeton University Press 2009). Tad M. Schmaltz, "Review Essay: *Descartes on Forms and Mechanisms*, by Helen Hattab, and *Descartes's Changing Mind*, by Peter Machamer and J. E. McGuire". *Oxford Studies in Early Modern Philosophy* 6 (2012): 349-72.

[22] Cf. *Principia* II 40; AT VIII-1 65, 2-19; CSM I 242*. *De homine* does not refer here to Descartes' early unpublished *Traité de l'homm*e, but to the sixth, never written part of the *Principia.*

a quite whimsical and still perfectly legitimate question. He wondered whether, according to Descartes' theory, the mind, while musing on a heated argument, would have heated the body it is attached too, in turn, by setting it in motion and, so, increasing the quantity of motion of the universe, in contrast to Descartes' rule of conservation.[23] Although, unfortunately, Descartes' death prevented him from replying, the passages which have just been shown seem to leave no doubts about his answer, even more astonishing than More's question.

One should be careful not to read too much into Descartes' texts, though. Even though Descartes asserts that God, inasmuch as he is operating a miracle, as well as man, insofar as he is freely behaving, can perform an action that does not follow the laws of nature, and he adds that *there are indeed cases in which this happens* as a matter of fact, Descartes has indeed never asserted that, in order for an action to count as free (for man) or miraculous (for God), it must breach the standard rules of motion. Such a claim, which might at first sound somewhat sophistical, reveals its true significance if one keeps in mind that for Descartes the "test" for freedom is to be found in the inner experience of a subject not to be forced by any "external force" in his decisions.[24] Paying an "exception" to some natural law is therefore for Descartes no necessary condition for an action to count as free. As a matter of fact, in a late personal annotation (possibly to his own copy of the Principles), Descartes ventured to imagine a new world, after the one of Le Monde, in which every human action could be accounted for in both

[23] Cf. From More, 23 July 1649; AT V 385 (on Principia II 36): "Quæro: Annon mens humana, dum spiritus accendit, attentius diutiusque cogitando, corpusque insuper ipsum calefacit, motum auget universi?".

[24] Cf. Meditationes IV; AT VII 56, 28 - 57, 27; CSM II 39-40: "The will, or freedom of choice… consists simply in the fact that we do not feel to be determined by any external force to affirm or deny (a nullâ vi externâ nos ad id determinari sentimus) what the intellect puts forward for affirmation or denial". See §1 for a more detailed analysis of this passage and, more in general, of Descartes' theory of freedom. For Descartes' theory of miracles, at work with an empirical case, see To Mersenne, 19 June 1639; AT II 557-58: "Vous commencez l'une de vos lettres par l'ombre du corps de St Bernard qui paraît sur une pierre; touchant quoi je m'assure qu'il est aisé, en la voyant, d'examiner si elle est miraculeuse, ou bien si ce sont seulement les veines de la pierre qui représentent cette figure; mais il est malaisé d'en deviner les moyens en ne la voyant pas, & je n'en puis dire autre chose sinon que, si elle est miraculeuse & qu'on la regarde avec dessein d'examiner si les veines de la pierre la peuvent représenter sans miracle, il me semble qu'on y doit remarquer quelque circonstance qui fera voir qu'elles ne le peuvent: car pourquoi Dieu ferait-il un miracle, s'il ne voulait qu'il fût *connu pour miracle?"* (emphasis added). The passage seems to confirm the reading that the violation of the laws of nature is not a metaphysical necessary condition for having a miracle produced, even though it might well be the case that such an infraction is a necessary epistemological condition for recognizing it as a miracle. According to Catholic dogma, actually, the Eucharist is precisely an instance of such an unnoticeable miracle.

physical and psychological term, being at the same time the mechanical result of a system of collisions taking place in the body and a free action of the mind:

> It is a strong conjecture to affirm that God would be greater, or more perfect the world, would be such and such the case. In case, for example, every determination of our will to a given local motion would always correspond (coincidat) to a corporeal *cause determining the same motion. Or, for instance, in case miracles would always agree (conveniant) with natural causes, and so on.*[25]

Even though Descartes hastens to rule out such a "pre-established harmony", or "cosmic conspiracy"– in Earman's terms – as a bold assumption (fortis conjectura) that could not be rationally justified, the passage is nonetheless extremely telling. It reveals in fact that Descartes did not see any straightforward inconsistency between his philosophical natural system and the thesis that all human actions can be – or, in a more robust formulation, have to be – explained in purely physical terms, as many authors after Descartes famously claimed: Leibniz, notably, and Kant.[26]

Quite a few philosophers after Descartes tried indeed to prove that the "better world" (mundus perfectior) that der *wahrhaften Anfänger der modernen Philosophie* had envisaged in his latest years is indeed the world in which we do happen to live. For Descartes, yet, as matter of fact some of the actions each of us is confronted with in his everyday experience cannot be accounted for by appealing to nothing but particles in motion according to the laws of inertia, of collision, and the principle of conservation of the quantity of motion. Accordingly, whereas

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[25] *Annotationes quas videtur D. des Cartes in sua Principia Philosophiæ scripsisse;* AT XI 654: "Fortis est conjectura ad aliquid affirmandum, quòd, illo posito, Deus major aut mundus perfectior intelligatur: ut quòd voluntatis nostræ determination ad motus localem semper coincidat cum causâ corporeâ motum determinante; quòd miracula cum causis naturalibus conveniant, &c." (in order to make the passage as clear as possible I have translated with some more freedom than as usual). Some piece of evidence in favor of the authenticity of these "remarks" have already been out forward in §3, based on a close parallelism between one of these annotationes and some passages from Descartes' letter. In the near future I intend to provide a commented edition of this text (unknown even to most Descartes' scholars) were I will argue at length for the authenticity claim, which for the time being I am forced to ask the reader to take on trust.

[26] The term (and the very idea) of a pre-established harmony is blatantly derived from Leibniz' philosophy and it was of course unknown to Descartes. It seems nevertheless to capture with a good accuracy Descartes' core thesis in this annotation of his, even though the text is without a doubt too sketchy to permit to evaluate Descartes' proper positions on the topic. The passage, moreover, is preserved among Leibniz' papers and it was transcribed during his stay in Paris between 1672 and 1676. It is so more than likely that this very text concurred in a crucial way to the development of Leibniz' theory of pre-established harmony; cf. Garber, "Mind, body, and the laws of nature", 166-67.

most philosophers after him, especially the ones who had endorsed a full-fledged determinism (think for example of Leibniz) could argue for the existence of other minds only per analogiam, Descartes thought he had a decisive argument to positively prove that he was not the only (embodied) mind in the world. Leibniz' only ground to attribute a mind to non-human animals (and, by the same token, to rational animals other than the thinking I), was indeed that, since humans and animals have analogous bodily constitutions, it is "plausible" that all of them have or lack thoughts.[27] But since everybody of us experiences in himself thoughts, it is reasonable to conclude that the same is the case for all animals – for all living beings, actually, although in different forms. For Leibniz the burden of proof was on the deniers of other minds, who in Leibniz' views were supposed to present an argument to call into question the "uniformity of nature". Descartes, as shown in detail in the next chapter, argued the other way around: he protested that the ones who had to put forward an argument were rather the thinkers who wanted to introduce additional entities in nature. In his writings Descartes argued in fact again and again that the mere presence of organs analogous to ours in other beings neither establish nor suggest that presence of a mind like our own, as clearly attested by automata. As a matter of fact, according to Descartes the analogy criterion fails to attest the presence of a mind even in the case of the "two-legged animal without feathers": Descartes denounced thus as inconclusive any argument along Leibniz' lines (a point that Leibniz accepts at least in part, presenting as he is the argument as a merely "probable" one).[28] Descartes indeed was ready to attribute a mind to beings with a body completely different than the one to which meditator's mind is attached, provided however that their behavior could not be explained by appealing to nothing but the laws of motion. According to Descartes, "exceptions" of this sort to the "ordinary course of Nature" were indeed not only metaphysically possible. They were, as a matter of fact, the case; they were real. If the interlocutors of the Search after Truth would have carried on their philosophical enquiry and their dialogue, according to Descartes they would indeed have discovered that no machine, no matter how sophisticated, could have ever been able to ask meaningful questions and appropriately answer to them (even by simply admitting that it did ignore the right answer). For Descartes, like it will be for Hegel, language counts indeed as *das Dasein des Geistes – as the immediate presence of the mind*. According to Descartes, every

[27] Leibniz, GP 7 XV, 329: "Idque confirmat ipsa rerum analogia. Cum enim in brutis omnia quoad perceptionem et sensum perinde se habeant ac in homine, et natura uniformis sit in varietate sua (uniformis quoad principia, varia quoad modos), verosimile est brutis etiam perceptionem inesse, immo præsumuntur bruta perceptione prædite, donec contrarium probatur".

[28] See for example the letter (discussed below) To Reneri for Pollot, April or May 1638; AT II 41; K 100.

word of "the animal that speaks" attests in fact right away to everyone able to understand it that united to the body of the "two-footed animal without feathers" there is a mind like his own. For Descartes in every animal that speaks a human being recognizes in fact something more valuable that the entire material world: a cognizer, a fellow, a "free cause" that deserves the respect of a truly god-like being.[29]

[29] Cf. *Passions de l'Âme*, III 162; AT XI 454, 13 - 455, 6; CSM I 388. The expression "causes libres" is also to be found in *Passions de l'Âme* II 55; AT XI 374, 6. Analogous expressions, *mutatis mutandis*, recur in the following proposition, devoted the opposite passion of "scorn" (cf. *Ibid.* AT XI 455, 10), a passion that without a doubt refer to both God(s) and men, as well as to demons and angels.

§20. Ζῷον λόγον ἔχον

Descartes expressed his fascination with machines already in his first extant writings. Since his juvenile years, Descartes started musing on machines able to reproduce animal and human behavior, bewitched by the legend of Archytas' dove, which was said by the Ancient to be able to fly, and by the moving statues designed to please the courts of his time.[1] Descartes was sometimes skeptical that the gross hands we happen to have could effectively handle gear as "subtle" as the ones that would seem to be required to make a machine to fly.[2] He insisted however that this was by no means an objection of principle against machines of this sort, leaving open the possibility that a more developed technology would have been able to attain these results. Descartes himself, actually, spent quite a few months of his life working out and improving a machine from grinding lenses together with the leading artisan of the time in the field, Villebressieu, aiming at a device which would have surpassed all previous ones in precision, to the point that Koyré could celebrate it as the "first modern machine".[3] The most famous of all Descartes' machines is however a machine he never built, and that he suspected humans being would have never been able to build: a "statue ou machine de terre" resembling up to the minutest details the interior and exterior configuration of a human body.[4] Descartes, at the beginning of *Treatise on Man* (1633) asked indeed his reader to imagine of this machine as "made

[1] Descartes described a fountain in which a statue representing Tantalus moving as if to drink was prevented every time from succeeding in *Regulæ* XIII; AT X 436-36. A statue representing Diana fleeing into the reeds as someone entered the grotto where she was bathing is described, with other akin machines, in Descartes' *Traité de l'homme*; cf. AT XI 131-32. See also AT X 232, 1-2: "Columba Architæ molas vento versatiles inter alas habebit, ut motum rectum deflectat" (Descartes' so-called *Cogitationes privatæ* were written between 1619 and 1621). On Descartes' understanding of machines and on his mechanistic account of biological processes, see Dennis Des Chene, *Spirits and Clocks: Machine and Organism in Descartes* (Ithaca, NY- London: Cornell University Press 2001). On the role of machines in Early Modern Philosophy see more in general Paolo Rossi, *I filosofi e le machine: 1400-1700* (Milano: Feltrinelli 1962).

[2] Cf. To Mersenne, 30 August 1640; AT III 163-64: "On peut bien faire une machine qui se soutienne en l'air comme un oiseau, *metaphysice loquendo*; car les oiseaux, au moins selon moi, sont des telles machines; mais non pas *physice* ou *moraliter loquendo*, parce qu'il y faudrait des ressorts si subtils, & ensemble si forts, qu'ils ne pourraient être fabriqués per des hommes".

[3] Alexandre Koyré, "Du monde de l'*à-peu-près* a l'univers de la précision" in Id., *Etudes d'historie de la pensée philosophique* (Paris: Colin 1961). On Descartes' collaboration with Villebressieu, see Giulia Belgioioso, "Descartes e gli artigiani" in Jean-Robert Armogathe – Giulia Belgioioso – Carlo Vinti eds. *La biografia intellettuale di René Descartes attraverso la "Correspondance"* (Napoli: Vivarium 1999), 113-65.

[4] *Homme*; AT XI 120, 4-5; Hall 2.

by God's hands" (*faite des mains de Dieu*), and yet as one in kind with "clocks, artificial fountains, mills and similar machines which, though made entirely by man, lack not the power to move, of themselves, in various ways".[5]

In *The World,* to which the *Treatise of Man* belongs, Descartes puts forward the story of this machine and of the big machine of the universe described in the *Treatise on Light* as a "fable" which is intended to make the reading of the treatise *moins ennuyeuse*.[6] In both cases, Descartes asks his reader to *regard*, to *consider*, to *conceive* of the world in its entirety and man's body as *nothing but extended* since, he claims, we do happen to understand this three-dimensional extension more clearly than anything else – at least as far as material objects as concerned.[7] Because of these statements, some commentators have taken *The World* to embrace a purely methodological and heuristics stance. Accordingly, in this treatise Descartes would have never intended to make a claim about how things actually *are*, but only recommended a different conceptual framework wherein to make better sense of them. *La fable du Monde* would therefore have been composed and would hence have to be evaluated on the basis of its usefulness, by leaving aside any question concerning its truth.

The mask under which Descartes was speaking can however hardly fool anybody, and Descartes himself, in introducing this fiction, declared that he found more convenient to "clothe" (*envelopper*) part of the long discourse he had in mind, claiming that the plain, naked truth was likely to prove too troublesome to most of his readers.[8] The "fable" of 1633 had indeed been intended by his author right from the beginning as a story about the world we are in, conveniently disguised under the appearance of a fable in order to circumvent criticisms: the formation of the world and of human beings from the primordial chaos were in fact topics that no theologians committed to creations would have ever left unchallenged.[9]

In *The World* Descartes, at the same time, was not simply *asserting* right away that corporeal substances are nothing but extended substances, with no substantial forms and real qualities attached. At the beginning of the treatise Descartes in fact put forward this claim only as a *working hypothesis*, which he intended to establish in the remainder of the work. In order to do

[5] *Ibid.* 15-24; Hall 4*.

[6] *Monde* V; AT XI 31, 16-21; CSM I 90.

[7] *Monde* VI; AT XI 33, 4-25; CSM I 91.

[8] *Monde* V; AT XI 31, 16-21; CSM I 90: "But in order to make this long discourse less boring for you, I want to clothe part of it in the guise of a fable, in the course of which I hope the truth will not fail to become sufficiently clear, and will be no less pleasing to see than if I were to set it forth wholly naked".

[9] In §26 I argue for a reading along similar lines of the *Rules*, another text in which Descartes is usually (but, to my eyes, mistakenly) taken to adopt a purely methodological stance.

so, Descartes' strategy was to *assume* the existence of machines perfectly identical in terms of constitution and arrangement of their material parts to some living beings, to then confront the operations these machines were capable of with the operations of their live models (as shown in the first part of this work, Descartes – already in *The World* – thought indeed to have an *a priori* demonstration that bodies are extended, the problem rather being whether they are nothing other than that). In case these machines would have turned out to be indistinguishable from the living being they had been patterned after, Descartes argued that there was indeed no reason to posit a non-material principle of action in animals, which would therefore have to be treated as mere machines. On the other hand, would these ideal machines have proven unable to reproduce some aspects of an animal's behavior, for Descartes this would have been counted as a (actually, as *the*) decisive criterion to credit this animal with a mind – i.e., with a principle of action that exceeds the potentialities of a system of levers and gears, for how much sophisticated.

Descartes was not indeed claiming that animals could be studied as nothing but machines with the hope to foster what he took to be a more convenient *explanatory model* for biology. Descartes' real intention in the *Treatise on Man* was to make a metaphysical claim, arguing on the basis of his natural philosophy that the *entities* posited by Aristotelians in order to account for animals' operations – first of all the sensory soul – were superfluous. According to Aristotelians, a living being and a machine with the same shape differed indeed not only in degree, but in kind, inasmuch as only the former was said to have a *substantial form*, whereas (as Descartes makes clear to Regius) "nobody says that the form of a clock is substantial", and so for all other artifacts.[10] The metaphysical divide between the two was actually taken to be so wide that Aristotle had argued that, no matter how accurate a reproduction of the exterior features would be, no apparatus of lenses could be legitimately called an "eye". According to Aristotelian philosophy, what makes an eye an eye is indeed its *function* – its capacity to apprehend colors, in this case – not the mere arrangement of its parts. And this functioning, Aristotelian argued, could not be accounted for by appealing to nothing but matter (see §21 below for a more detailed exposition of this doctrine). By means of his natural philosophy Descartes intended to show that there were however no reasons to posit any like "substantial forms" and that the entire behavior of animals could in fact be explained by appealing to nothing but the movement of matter corpuscles according to the laws of motion. In Descartes' intention a razor would have proven that the fable of *The World* is as a matter of fact the only story to be told.

[10] To Regius, January 1642; AT III 505; K 208. For a detailed analysis of this claim see Helen Hattab, *Descartes on Forms and Mechanism* (Cambridge - New York: Cambridge University Press 2009).

The *Meditations*, in Descartes' eyes, had established that (God aside) in the world there is however at least *one* non-corporeal substance: the meditator himself. As for other intelligences, the meditator declared in the *Second Meditation* that he could not tell, though, that what we had always been taken to be human beings intent upon their business could turn out to be machines:

> But then if I look out of the window and see men crossing the square, as I just happen to have done, I normally say that I *see* the men themselves, just as I say that I see the wax. Yet do I see any more than hats and coats which could conceal automata? I *judge* that they are men. And so something which I thought I was seeing with my eyes is in fact grasped solely by the faculty of judgment which is in my mind.[11]

Once bodies had been proven to be and to be extended, so that physics could start its job, were there any grounds for the meditator to reject solipsism? The meditator cannot in fact rely on introspection to ascertain the presence of thought in anyone other than himself: from the third-person-perspective the presence of like mental activity can only be *inferred* (once excluded any direct insight into others' consciousness of the sort of the telepathy and any analogous *Träume eines Geistersehers*). Descartes did not lay down this solution to the problem of other mind in the *Meditations*, most probably because he was satisfied with his was of handling the issue in the *Discourse*, written only a few years before and that Descartes was clearly taking to be known to most of his readers (the differences between the 1637 *Discourse* and the *Meditations* being the main topic of Descartes' *Preface* to the later work).[12]

After having laid down the basics of his metaphysics in the *Four Part* of the *Discourse* – which can be taken as a first draft of the *Meditations* – in the *Fifth Part* Descartes started indeed to consider some specific physical phenomena such as blood circulation in order to explain how he intended to deal with them (in most case, how he had dealt with the in *The Man*, which will be published only after Descartes' death). In this section of the work, Descartes claimed that in *The World* he was able to account in purely mechanical terms for all the operations usually credited to the vegetative and sensitive *souls*: from perception to imagination, from the passions to the locomotion, from memory to the *vis æstimativa* as well as for nutrition, growing and reproduction and, finally, for the very fact of life. As a key and exemplary specimen of his achievements, Descartes put forward his explanation of blood circulation, which he claimed to

[11] *Meditationes* II; AT VII 32, 4-10; CSM II 21 (emphases added).

[12] Cf. *Meditationes*, *Præfatio*; AT VII 7-10. On the relevance of this passage for the issue at stake, see Gareth B. Matthews, "Descartes and the Problem of Other Minds" in Amélie Oksenberg Rorty ed., *Essays on Descartes' Meditations* (Berkeley - Los Angeles - London: University of California Press 1986), 141-51.

have brought Harvey's account to perfection precisely because it disposed of all the non-purely mechanical principle to which Harvey had appealed in his groundbreaking *De motu cordis* (1628).[13] On the basis of these results, Descartes concluded that in the case of machines of animals other than men, "we should have no means of knowing (*nous n'aurions aucun moyen pour reconnaître*) that they did not possess entirely the same nature as these animals", so that we would lack any argument to claim that animals themselves are in fact anything more than machines.[14] Descartes, in order to better illustrate this point, also devised a *Gedankenexperiment*, asking his reader to imagine of a man who has been raised without ever seeing animals but was trained to build machines able to perform at least some of their actions. Would he have been able – once confronted with the animals we know – to tell the difference between them and the machines he was used to fabricating? He would not, replied Descartes, for "there is no doubt that he would not come to the conclusion that there was any real feeling or emotion in them, but would think they were automata, which, being made by nature, were incomparably more accomplished than any of those he had previously made himself".[15]

What about *human* animals, though? Well, as far as the "two-footed animals without feathers" are concerned, Descartes thinks that they are on the other hand capable of operations which cannot be explained in purely mechanistic terms, *viz.* by resorting to nothing but the figure and motion of particles differently arranged. According to Descartes, the animals of this kind show in fact a behavior which is simply to ingenious for a machine, so that it must be

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[13] On the differences between Harvey's and Descartes' accounts of blood circulations, see Étienne Gilson, *Études sur le rôle de la pensée médiévale dans la formation du système cartésien* (Paris: Vrin 1930), 51-101 and, more recently, Annie Bitbol-Hesperies, *Le Principe de Vie chez Descartes* (Paris: Vrin 1990). The metaphysical and epistemological implications of Descartes' account of blood circulation have been admirably described by Ernst Cassirer, "Descartes & l'idée de l'unité da la science", *Revue de Synthèse* 14 (1937): 7-28.

[14] *Discourse* V; AT VI 56, 10-15; CSM I 139. It is unfortunately impossible to enter here into the details of Descartes' argument, which requires him to show that *all* functions of the sensory soul can be accounted for in mechanical terms. For an insightful presentation of Descartes' strategy see Gary Hatfield, "Mechanizing the Sensitive Soul" in Gideon Manning ed., *Matter and Form in Early Modern Science and Philosophy* (Leiden: Brill 2012), 151-86 and, of the same author, "The *Passions of the Soul* and Descartes's machine psychology", *Studies in History and Philosophy* 38/1 (2007): 1-35.

[15] To Reneri for Pollot, April or May 1638; AT II 41; K 100. Descartes is arguably taking this rhetorical device from Galileo, who had made use of a similar *Gedankenexperiment* about what could be called a "savage scientist" in both the *Saggiatore* and the *Dialogo*; respectively *Il Saggiatore* (Milano: Feltrinelli 1965), 126-28; *Dialogo sopra i due massimi sistemi del mondo* (Torino: Einaudi 1970), 77. Very insightful remarks on Galileo's and Descartes' rhetorical and argumentative strategies in Francesco Orlando, *Illuminismo, barocco e retorica freudiana* (Torino: Einaudi 1997), 128-52.

concluded that besides having a body they also have a non-corporeal principle of action: a mind (as explained in detail in §17, Descartes conceives in fact of all finite non-corporeal substances in terms of *res cogitantes*). It is indeed precisely by virtue of such a mind that human beings are to be defined the "rational animals". More specifically, Descartes thinks that there are *deux moyens très certains* for everybody of us to realize that he is not the only finite mind in the world.

> In case there were machines bearing a resemblance to our bodies and imitating our actions as closely as morally possible, we would still have two very certain means of recognizing that they were not real men.
>
> The first is that they could never use words, or put together other signs, as we do in order to declare our thoughts to others. For we can certainly conceive of a machine so constructed that it utters words, and even utters words that correspond to bodily actions causing a change in its organ, so that if you touch it in one spot it asks what you want of it, if you touch it in another it cries out that you are hurting it, and so on. But it is not conceivable that such a machine should produce different arrangements of words so as to give an appropriately meaningful answer to whatever is said in its presence, as the dullest of men can do (*non pas qu'elle les arrange diversement, pour répondre au sens de tout ce qui se dira en sa présence, ainsi que les hommes les plus hébétés peuvent faire*).
>
> Secondly, even though some machines might do some things as well as we do them, or perhaps even better, they would inevitably fail in others, which would reveal that they are acting not from understanding, but only from the disposition of their organs (*elles n'agiraient pas par connaissance, mais seulement par la disposition de leurs organs*). For whereas reason is a universal instrument, which can be used in all kinds of situations, these organs need some particular action; hence it is for all practical purposes impossible for a machine to have enough different organs to make it act in all the contingencies of life in the way in which our reason makes us act.[16]

The "two criteria" presented by Descartes in the *Discourse* to distinguish between agents endowed with a mind and automata are clearly to be understood as an elaboration of the classical definition of man as the ζῷον λόγον ἔχον – "the animal endowed with λόγος", a term that in Greek stands for both *language* and *reason*. Descartes claims that the criteria that enable to tell apart human beings from machines are the same that permit one to draw a distinction between human animals and all non-rational ones.[17] In order to demonstrate that non-human animals lack a mind, Descartes must indeed prove that "brutes" lack both linguistic skills and the highly adaptive behavior displayed by human beings and which, according to Descartes, is a clear expression of their rational capacities. By considering more closely Descartes' two criteria

[16] *Discours* V; AT VI 56, 15 - 57, 15; CSM I 139-40*.

[17] Cf. *Ibid.* AT VI 57, 16-18: "Or, par ces deux mêmes moyens, on peut aussi connaître la différence qui est entre les hommes & les bêtes" (the passage immediately follows the one quoted here above in the main text).

for detecting the presence of minds, they are both ultimately based on *responsiveness*, of which Descartes stresses the *adequacy* in regard to linguistic responses and the *flexibility* in regard to counter-actions. As far as action-responsiveness is concerned, Descartes thought in fact that all machines, sophisticated though they might be, are subject to *material limitations* which depend precisely on their being corporeal entities. As Descartes pointed out in the *Meditations*, these limitations are of course in place also in the case of the human body. As Descartes claimed in the light of his physiological studies, "the nature of the body is such that whenever any part of it is moved by another part which is some distance away, it can always be moved in the same fashion by any of the parts which lie in between, even if the more distance part does not do anything".[18] Descartes made this statement in the attempt to explain why one sometimes experiences, for example, pain in the foot although this pain-sensation depends in fact on a malfunctioning of the lumbar region (the phantom-limb phenomenon being for Descartes the most remarkable instance of this fact). These limitations are for Descartes so essential to the *corporis machinamentum* that not even God could circumvent them as he decided to "unite" a finite mind to one of this body. Perceptual errors of this sort, according to Descartes, do not therefore result from a faulty constitution of our mental set-up, but from some intrinsic constraints of the material system the perceptual process is implemented. Consequently, perceptual errors are not to be blamed on God for having set our mind the way he did, but are intrinsic to any mind *qua* being embodied (why on earth God has ever decided to embody our mind lies on the other hand for Descartes outside the purview of human comprehension).[19] All hardware circuits of all machines are according to Descartes subject to analogous constraints, of which the one just mentioned is just an example, maybe not even the most severe. Descartes, who took these technological limitations to be insurmountable, spurned accordingly as hoaxes some of the (in his eyes, alleged) machines most admired by his contemporaries:

> There is without a doubt some impostor's tricks in that talking head, as I hardly believe that springs and pipes are enough to make the head recite the entire *Pater noster*, as well as to make singing the rooster of Strasbourg clock.[20]

[18] *Meditationes* VI; AT VII 86, 24-28; CSM II 60.

[19] On Descartes' theory of perception as presented in the *Sixth Meditation* – and his theory of judgment as defended in the *Fourth* – as driven by concerns in "theodicy", see Zbigniew Janowski, *Cartesian Theodicy: Descartes' Quest for Certitude* (Kluwer: Dordrecht 2000).

[20] To Mersenne, 8 October 1629; AT I 25 (my translation).

Descartes was not of course denying that one could built machines capable of producing sounds, organs being his favorite example thereof. Nor did anything exclude that the sounds so produced could correspond to phonemes of a spoken language. A Cartesian of strict observance like Cordemoy did indeed devote an entire treatise to study how the tongue, the teeth and all remaining organs of the vocal apparatus were to move in order to produce all phonemes, tellingly entitled *Discours physique de la parole* (1668). At least in principle all these movements could of course be reproduced also by a machine, as Descartes himself was ready to admit: in his views, the simple fact that some non-human animals were able to reproduce a few human sentences (think of a parrot) was not in fact to be taken as a piece of evidence that "brutes" too have a mind: Descartes himself has in fact pointed out that men happen to utter words – in singing, be example, or in repeating something they know by heart – without thinking of their meaning. A Cartesian like Pascal recommend accordingly his atheist readers looking for faith to repeat over and over again their prayers to the point of no longer perceiving that the words they were uttering had no sense for them, to the point of "becoming like beasts": the sheep of the Lord (the famous *vous abêtira* of the *Pensées*).

If Descartes was skeptical about the "praying head" Mersenne appeared to have been so intrigued by, this was in fact only because he took such a machinery to exceed by far the capabilities of the technology of his time, that he experienced by hand in trying to construct the machine for grinding hyperbolical lenses mentioned above.[21] Descartes, at the same time, appears to have realized any arguments along these lines were nonetheless scarcely persuasive, insofar as they depended too much on the specific condition of machine technology in the first half of the 17th Century. Analogously, he realized that someone less confident in the capabilities of machines would have taken parrot talk as a clear witness what non-human animals – or at least some of them – can deal meaningfully with words.

The opponents Descartes had in mind were by no means straw-men. In the *Discourse* Descartes credited "quelques Anciens" with the theory "que les bestes parlent, bien que nous n'entendions pas leur langage", most probably referring to Lucretius' theory as exposed in his *De rerum natura*.[22] The thesis of an animal language was not however just a piece of erudition on Descartes' part. Two leading French intellectuals of the previous century like Pierre de

[21] Florent Schuyl mentioned in this regard one more talking head: "the admirable head of Albert the Great of which speaks Giovanni Battista Della Porta in his *Natural Magic*"; cf. *L'Homme, & un Traité de la formation du fœtus du mesme auteur avec les remarques de Louys de La Forge,* edited by Claude Clerselier (Paris: Le Gras 1664); reprint (Paris: Fayard 1999), 398.

[22] *Discourse* V; AT VI 58, 20-21.

Charron and Michel de Montaigne had indeed defended at length the claim that non-human animals too speak (in his tremendously influential *Apologie de Raymond Sebond* Montaigne explicitly referred to Lucretius: Descartes had most probably this essay in mind when he wrote the passage of the *Discourse* quoted above). Montaigne maintained in fact that if we had in our possession King Salomon's famous ring, we would be able to speak, as he was once said to be, *mit dem Vieh, den Vögeln und den Fischen* and to understand their mutual talks.[23] Even closer to Descartes, in 1603 Girolamo Fabrizio d'Acquapendente – the well-known professor of anatomy in Padua – devoted a booklet precisely to prove that animals do speak, the *De brutorum loquela*.[24]

Descartes referred by name to both Montaigne and Charron in his letter of 23 November 1646 to the Marquis of Newcastle, where he came back to the topic of the *Fifth Part* of the *Discourse* from a more mature perspective. In this letter Descartes leaves in fact aside any consideration concerning the alleged limits of machines to rather focus on the key fact that all mechanical apparatus – sophisticated though they might be – are only responsive to material stimulations, all these being in turn construed by Descartes as instances of local motion. If the limitation of the hardware could in fact be possibly circumvented, Descartes insisted that the kind of inputs a mechanical system is responsive to is on the other hand fixed. He tried accordingly to work out an argument to tell apart ensouled bodies from pure machines on the basis of this latter criterion, which depending as it was on what Descartes took to be an essential characteristic of machines as such would have not been affected by any improvement in technological skills. In his 1646 letter Descartes came thus to argue that the only certain criterion to establish that a certain being was not behaving in accordance to nothing but the laws of motions was to identify as least *one* reaction of this being which could not be taken to have been triggered by a material change (and, consequently, not been processed by a mechanical system).

Descartes, more specifically, challenged the advocates of animal language to produce at least one instance of what they regarded as animal "words" which could not be explained as a reaction to physiological stimuli and, more specifically, to "the movements of passions". Descartes, as is well-known, indicated in fact by the term "passion" both the *bodily state* that

[23] Cf. To the Marquis of Newcastle, 23 November 1646; AT IV 575; K 303: "It cannot be said that they speak to each other but we cannot understand them; for since dogs and some other animals express their passions to us, they would express their thoughts also if they had any". The reference to King Salomon's Ring (which derives of course from the Bible) is not taken from any modern author but it the title of a well-known book of Konrad Lorenz, one of the founders of modern ethology.

[24] The work is discussed by Schuyl in his *Preface*, which presents more in general a rich survey of the previous literature (both ancient and modern) on animals' language and soul; cf. *L'Homme, & un Traité de la formation du fœtus*, 402.

would make a mind conjoined to this body fell hope or joy and the *phenomenal counterpart* of these bodily movements (hope and joy as experienced).[25] While the former is for Descartes to be found in animals too (these commotions depending on the body constitution alone) the issue at stake is precisely to determine – by means of the language test – whether animals have a mind and, thus, if we can legitimately attribute to them some sort of perception.[26] Descartes' point was in fact to distinguish between "words" in the proper sense of the term and the "sonorous reactions", so to say, to some mechanical stimulus, from either external or internal senses, where the latter are supposed to encompass both appetites (such as hunger) and the passions in the usual sense of the term (rage and fear, by way of instance). According to Descartes, if men and dogs alike whine when flogged, this happens indeed only because both have lungs and a throat, so that the sounds they produce are to be regarded as identical in kind with the sounds produced by a bagpipe.

If the general strategy of Descartes' argument was new, its premises went however back to Aristotle, who in his *De interpretatione* had already claimed that cries and interjections do not count as proper words, since they are only natural responses to certain bodily conditions.[27] By insisting that, in order to count as words, the sounds uttered by an animal must have no relation with any passions, Descartes explained that his intention was "to rule out not only cries of joy or sadness and the like, but also whatever can be taught by training (*enseigné par artifice*) to animals". Descartes was indeed among the first, if not the very first, theorizer of the concept of respondent conditioning, the so-called "classical" or "Pavlovian" conditioning, according to

[25] See the following chapter for a more detailed exposition of Descartes' theory on the topic. For a valuable presentation of Descartes' views on non-human animals, see Gary Hatfield, "Animals" in Janet Broughton – John Carriero eds., *Companion to Descartes* (Malden: Blackwell 2008), 404-25.

[26] The topic is of course at the center of the *Passions of Soul*. For an example of this claim in the text referred above see at least To Newcastle, 23 November 1646; AT IV 573-74: "As for the movements of our passions, even though in us they are accompanied by thought because we have the faculty of thinking, it is nevertheless very clear that they do not depend on thought, because they often occur in spite of us. Consequently, they can also occur in animals, even more violently than they do in human beings, without our being able to conclude from that that animals have thought".

[27] *Discourse* V; AT VI 58, 16-19; CSM I 140-41: "we must not confuse speech with the natural movements which express passions and which can be imitated by machines as well as by animals". For an insightful presentation of Descartes' theory of language, see Jean-Pierre Seris, "Language and Machine in the Philosophy of Descartes" in Stephen Voss ed., *Essays on the Philosophy and Science of René Descartes* (Oxford: Clarendon Press 1993), 177-92, who correctly points out the shortcomings and error in approach of Noam Chomsky, *Cartesian Linguistics: A Chapter in the History of Rationalist Thought* (New York: Harper and Row 1966). For a more general approach to the topic as treated by Early Modern thinkers, see Jean-Pierre Seris, *Langages & machines à l'âge Classique* (Paris: Hachette 1995).

which "if you whipped a dog five or six times to the sound of a violin, it would begin to howl and run away as soon as it heard that music again".[28] Descartes appears to have been so confident in his theory that he never took care to perform this experiment, something that "Monsieur Grat" (Mister Scratch, so Descartes named this dog) must have certainly appreciated. Only if he had a mind to do so, of course. According to Descartes this conditioning can be carried out to the point of suppressing an animal's instinctual reactions, as is attested by hunting dogs: "when a dog sees a partridge, it is naturally disposed to run towards it… nevertheless setters are commonly trained so that the sight of a partridge makes them stop".[29] By means of similar conditionings Descartes argued that animals can also be trained – or, maybe better, "programmed" – to reproduce human phonemes, while yet also arguing that there was no reason to suppose that these animals were anyhow aware of the meaning of these sounds. In Descartes' view, actually, there was not even reason to believe that animals could suspect that sounds may have a meaning at all:

> If you teach a magpie to say "bonjour" to its mistress when it sees her approach, this can only be by making the utterance of this word the expression of one of its passions. For instance, it will be an expression of the hope of eating, if it has always been given a titbit when it says it. Similarly, all the things which dogs, horses and monkeys are taught to perform are only expressions of their fear, their hope or their joy, and can therefore be performed without any thought (*en sorte qu'ils les peuvent faire sans aucune pensée*).[30]

According to Descartes, the crucial difference between non-human animals such as parrots and magpies as opposed to "madmen" and "the most stupid child" is indeed that only human beings respond – or at least try to respond – meaningfully (*au sens*; *à propos*) to what they have been asked, whereas a magpie presented with some food will keep on repeating "bonjour" to

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[28] To Mersenne, 18 March 1630; AT I 134; K 20. As pointed out by Canguilhem, it is not fully accurate to speak in Descartes' physiology of a "reflex" in the same the term would be used by later authors; Georges Canguilhem, *La Formation du concept de réflexe aux XVII^e^ et XVIII^e^ siècles* (Paris: Presses Universitaires de France 1955). Beyssade and Cimino rightly remarked that Canguilhem put nonetheless the issue too forward, in downplaying the role of Descartes for the development of this key concept; Jean-Marie Beyssade, "Réflex ou admiration. Sur les mécanismes sensori-moteurs selon Descartes" in Jean-Luc Marion ed., *La Passion de la Raison: Hommage à Ferdinand Alquié* (Paris: Presses Universitaires de France 1983), 113-30. Guido Cimino, "Teoria del sistema nervoso e ottica fisiologica in Descartes" in Giulia Belgioioso – Guido Cimino – Pierre Costabel – Giovanni Papuli eds., *Descartes: Il* Metodo *e i* Saggi (Roma: Istituto della Enciclopedia Italiana, 1990), I 247-72.

[29] *Passions* I 50; AT XI 370, 4-8; CSM I 348.

[30] To Newcastle, 23 November 1646; AT IV 574; K 303*.

her mistress well after midday.[31] For Descartes non-human animals have in fact available only a fixed and quite limited set of responses, whereas human beings continuously come up with new words and unexpected solutions.[32] Descartes could indeed provide an answer to why human beings are not only the only animals able to reason, but also the only animals capable of laughing: no less than a "universal instrument" would in fact be required both to improvise and to understand a *jeu de mots*. Contrary to this never-ending, playful inventiveness, all animal actions – and, more specifically, all sounds produced by animals – would on the other hand only result either from "l'architecture de leurs membres" or from induced conditioning.[33] According to Descartes there is indeed no reason to claim that non-human animals would be experiencing anything of what they are doing, or what they are taught. They would only be "calibrated", as they were an instrument. A *material instrument*, with all the drawbacks but also the assets of the case.

The drawbacks have already been pointed out: whereas in the case of material instruments there are in fact major constraints on the number of things they can do, Descartes argued that human beings have at their disposal "un instrument universel": "la raison", which being non-material can adapt itself to any circumstances. Descartes, however, also agrees with Montaigne that animals perform in fact some actions better than men. For Montaigne, this was a compelling proof that some animals are in fact more intelligent than we humans, or at least differing only in degree for us, as it would be attested by a rich repertoire of anecdotes speaking of cunning foxes, schools of tunas cut out for math as swarms of bees for geometry, cocks with a perfect natural timing.[34] Descartes, as for language, was willing to accept most of Montaigne's cases (tunas aside), but only to turn the argument on its head. Descartes argued indeed against Montaigne that the perfect timing of swallows should not surprise that much, since clocks too

[31] Cf. *Discourse* V; AT VI 58, 7-16. La Forge argues that if people talking while asleep happen to answer *à propos* this is only a coincidence (*par hazard*): even in the case of a human being for a word to properly count as a word he must indeed be aware of what he is doing and intending to; cf. *L'Homme, & un Traité de la formation du fœtus*, 377. In his letter to the Marquis of Newcastle, Descartes explicitly argues that the proviso that words have to be "à propos" is intended to rule out parrots talk from the proper concept of language without excluding nevertheless the speaking by mad people, "qui ne laisse pas d'être à propos des subjects qui se présentent, bien qu'il ne suive pas la raison". Descartes' definition sounds indeed quite *ad hoc*, and threatens therefore to turn his entire line of reasoning into an elaborated *petitio principii*.

[32] On the importance of creativity as a criterion to distinguish between humans and all other animals, see Dominik Perler, "Descartes über Fremdpsychisches", *Archiv für Geschichte der Philosophie* 77 (1995): 42-62.

[33] To Gibieuf, 19 January 1642; AT III 479.

[34] Montaigne, *Essay* II xii. Cf. To Newcastle, 23 November 1646; AT IV 573: "et crois qu'il y en peut aussi avoir qui aient des ruses naturelles, capables de tromper les hommes les plus fins".

are fairly more precise than human beings in telling the time, and so are swallows in "making a summer" exactly because they are nothing but flying clock, a well-male and successful device combining Archytas' dove with the singing rooster of Strasbourg clock:

> I know that animals do many things better than we do, but this does not surprise me. It can even be used to prove that they act naturally and mechanically, like a clock which tells the time better than our judgment does. Doubtless when the swallows come in spring, they operate like clocks.[35]

In a private annotation written between 1619 and 1621, just a few lines after having declared free will a miracle, Descartes wrote that "from some highly perfect actions performed by animals, we suspect that they lack a free will".[36] To the best of my knowledge Descartes never used this argument again in his mature writings, but this line of reasoning was most probably working in the background of his critique to Montaigne. According to Descartes, anyone of use would be able to recognize a fellow mind in a human animal not only by virtue of his skillfulness and his statements, but also because of his clumsiness and imperfections. Instead of Montaigne's thousands, for Descartes one anecdote alone would have sufficed: "it is said" he wrote to Newcastle "that those who walk in their sleep sometimes swim across streams in which they would drown if they were awake".[37] Whereas the machine of their body would have safely guided the unaware sleep-walkers to the other shore, if awake they would indeed haves started to overthink and called into question the ability to swim all animals have, and panicked. These doubts, these uncertainties were for Descartes a clear sign that human beings are finite, that they are not "the most perfect being". Still, for Descartes this irresolution also attests that humans being can make choices, that they can in fact resolve on something. That human beings, contrary to animals, possess a free will. And in case someone had to decide whether to be free or to be a good swimmer, at least in this case his reason, although limited and imperfect, would have certainly had no doubt on which of the two to pick.

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Descartes is sometimes credited with an *a priori* argument to rule out the presence of a mind in

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[35] Cf. To Newcastle, 23 November 1646; AT IV 575; K 304. But see already To ***, March 1638; AT II 40.

[36] *Cogitationes privatæ*; AT X 219, 3-4: "Ex animalibus quibusdam actionibus valde perfectis, suspicamur ea liberum arbitrium non habere". See *Ibid.* AT X 218, 19-20: "Tria mirabilia fecit Dominus: res ex nihilo, liberum arbitrium, & Hominem Deum". On these annotations, see Descartes, *Étude du bon sens, La recherche de la verité et autres écrits de jeunesse (1616-1631)*, eds. Vincent Carraud – Gilles Olivo – Corinna Vermeulen (Paris: Presses Universitaires de France 2013), 58-59.

[37] To Newcastle, 23 November 1646; AT IV 573.

all animals other than men, which a long-running tradition has categorized as "non-rational" animals. According to the Aristotelian model of the soul, the so-called "brutes" would therefore lack the rational or intellectual soul and endowed only with the vegetative and the sensory ones. Non-rational animals too were in fact believed by Aristotelians – and, as a matter of fact, by virtually all philosophers before Descartes – to be able to sense, and to imagine, all actions that for most philosophers did not require an intellect. As shown in §5, Descartes' account of the faculties of the mind was however thoroughly different. In the course of the *Meditations*, the meditator discovers in himself "faculties for certain special modes of thinking (*facultates specialibus quibusdam modis cogitandi*)" beside the pure understanding, "namely, the faculties of imagining and sensing".[38] Aristotelians too would have completely agreed with Descartes on this point: for them as well human beings too do in fact have not only an intellectual, but also a sensory – as well as vegetative – faculty, even though they were fiercely debating since centuries about how this was to be understood from a metaphysical point of view. Some Aristotelians argued in fact for a plurality of substantial forms, not just conceptually but really distinct from each other, whereas other thinkers of this philosophical tradition defended a unitarian thesis, claiming that there is *one* single substantial form and hence a single soul in human beings. Descartes resolutely sided for this latter approach, which he pursued to its most extreme consequences, to a point that virtually no Aristotelians would have ever been ready to subscribe it. Not even the most resolute supporters of the unity of the soul had in fact ever gone so far as to affirm that the different faculties of the soul *essentially* involve the understanding in their very definition. According to Descartes the faculties of sensing and imagining – both included in the Aristotelian in the sensory soul, as sub-faculties thereof – "include an intellection in their formal concept (*intellectionem enim nonnullam in suo formali conceptu includunt*)" and should therefore be construed as "modes" of the "thinking substance".[39] If this is the case, it would however seem to follow that,

[38] *Meditationes* VI; AT VII 78, 21-18; CSM II 54*. *Cogitatio* includes in fact also volitions, whereas here Descartes intends to stress that sensibility and imagination are *cognitive* in nature and involve therefore, more specifically, *intellectio* – i.e., understanding. An analogous shift in *Principia* I 55 (AT VIII-1 32, 1-9), whose title mentions the "modi cognoscendi", whereas the article rightly speaks, in more general terms, of "cogitationum modos", given the fact that Descartes mentions therein also "volitionem", besides "intellectionem, imaginationem, recordationem".

[39] *Meditationes* VI; AT VII 78, 21-18; CSM II 54*. *Cogitatio* includes in fact also volitions, whereas here Descartes intends to stress that sensibility and imagination are *cognitive* in nature and involve therefore, more specifically, *intellectio* – i.e., understanding. An analogous shift in *Principia* I 55 (AT VIII-1 32, 1-9), whose title mentions the "modi cognoscendi", whereas the article rightly speaks, in more general terms, of "cogitationum modos", given

in order to imagine and sense, someone must first of all be able to understand. Or, to cast the issue in the terms of the Aristotelians, that the sensory soul could not subsist independently of the rational soul. The concept of a non-rational sentient being should consequently be rejected as a *contradictio in adjecto*. But since non-human animals were taken to be irrational animals, it follows that non-human animals are non-sentient beings.

As is pointed out by Landucci, around Descartes' time an argument along these lines had been defended by Gómez Pereira in his 1554 *Antoniana Margarita*. Pereira was a distinguished physician at the time (appointed by Philipp II to take care of Prince Charles) and his thesis that non-human animals must be denied sense-perceptions enjoyed quite a bit of popularity in the decades to come. Suárez too discusses it in his *De Anima* (posthumously edited in 1621) and still in 1662 Florent Schuyl explicitly referred to Pereira in his *Preface* to the Latin edition of the *Traité de l'Homme* as an important precursor of Descartes' position.[40] There is no evidence that Descartes read Pereira, but it is safe to assume that he was at least acquainted with Suárez' counterarguments (and, hence, with the thesis that for some thinkers – unnamed by Suárez – in order to sense an animal must first of all by able to understand). Descartes seems to be well aware of the *Siglo de Oro* debates concerning the faculties: it is indeed hard to believe that Descartes was not conversant with Fonseca's arguments against the notion of a vegetative soul and in favor of a purely mechanical account of plants.[41]

In none of his writings, however, did Descartes present any arguments along Pereira's lines. To the best of my knowledge, the only two passages were Descartes seems to suggest that, if one is to ascribe a soul to animals, this has in fact to be of the same nature of man's is in the above-mentioned 1646 letter to Newcastle and in a letter to More dated 5 February 1649. In these late letters Descartes argues against the thesis that non-human animals have a soul on the other that, were this the case, "they would have an immortal soul like us" – meaning of course "like us humans being":

> The most that one can say is that though the animals do not perform any action which shows us that they think, still, since the organs of their bodies are not very different from ours, it may be conjectured that there is attached to these organs some thought such as we experience in ourselves, but of a very much less perfect kind. To this I have nothing to reply except that if they thought as we do, they would have an immortal soul

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the fact that Descartes mentions therein also "volitionem", besides "intellectionem, imaginationem, recordationem".

[40] See Suárez, *De anima* (Lyon 1621), I c.5 §3; quoted in Sergio Landucci, *La mente in Cartesio* (Milano: FrancoAngeli 2002), 45.

[41] For the late Scholastic debates on these issues, see Dennis Des Chene, *Life's Form: Late Aristotelian Conceptions of the Soul* (Ithaca, NY- London: Cornell University Press 2000).

like us. This is unlikely (*ce qui n'est pas fort vraisemblable*), because there is no reason to believe it of some animals without believing it of all, and many of them such as oysters and sponges are too imperfect for this to be credible.[42]

I see no argument for animals having thoughts except this one: since they have eyes, ears, tongues and other sense-organs like ours, it seems likely that they have sensation like us; and since thought is included in our mode of sensation, similar thought seems to be attributable to them. This argument, which is very obvious, has taken possession of the minds of all men from their earliest age. But there are other arguments, stronger and more numerous, but not so obvious to everyone, which strongly urge the opposite. It is not in fact so likely (*non sit tam probabile*) that worms, flies, caterpillars and other animals have immortal souls rather than they move like machines.[43]

Descartes' case against the traditional ascription of a soul to non-human animals is not indeed based on the objection that this soul would have to be *rational* (as for Pereira). In the *Passions of the Soul* Descartes distinguished indeed between the two issues, claiming that "beasts lack reason and *perhaps* also thought" in general, sense-perceptions included.[44] Descartes' objection is rather that even the soul of the animals usually demoted by Aristotelians as "imperfect" – so imperfect to be generated also spontaneously – would have to be *immortal*. The bugbear evoked by Descartes against his opponents was in fact for the main part a theological one, and a quite traditional argument to deny non-human animals a soul like men's. Descartes himself, however, presents the argument only as a "probable" one. The explicit reason why Descartes argues along these lines is that questions of this sort exceed the purview of a finite intelligence, which cannot therefore presume the settle the question once and for all. At a closer look, however, these very same limitations make Descartes' argument even less compelling than the letters would seem to suggest, and this according to Descartes' own standards.

As pointed out in §15, Descartes maintained that the arguments put forward in the *Meditations* for the real distinction between the *res cogitans* and the *res extensa* disprove the

[42] To Newcastle, 23 November 1646; AT IV 576; K 304.

[43] To More, 5 February 1649; AT V 277; K 366. Descartes started arguing that the traditional accounts of the soul can hardly make sense of the claim that only that the sensory soul is mortal already in To Plempius, 3 October 1637; AT I 414; K 62: "Moreover, since these people posit so little difference between the operations of a man and of an animal, I do not see how they can convince themselves there is such a great difference between the natures of the rational and sensitive souls. On their view, when the sensitive soul is alone, its nature is corporeal and mortal; when it is joined to the rational soul, it is spiritual and immortal".

[44] *Passions* I 50; AT XI 369, 26-27; CSM I 348*: "encore qu'elles n'aient point de raison, ni *peut-être* aussi aucune pensée" (emphasis added).

argument that the soul *must* annihilate as soon as the body is no longer in condition to be united to the mind. Descartes, however, also claimed that "no reason guarantees us" that our mind is in fact immortal, in case one is looking – as, according to Descartes, one should be in philosophy – for the utmost kind of certainty, what Descartes called "metaphysical certainty".[45] Descartes' argument against the existence of a soul in non-human animals based on the alleged immortality of this (alleged) soul is therefore to be disregarded as an argument *ad hominem*, so that it can be perfectly explained why Descartes had never advanced it in his public writings.

What kind of argument is Descartes' argument that human beings are the only animals with a mind then? The clearest formulation of this point is to be found in the above-mentioned letter to More of 5 February 1649, and comes immediately before Descartes' supplementary (and inconclusive) rationale in favor of the same claim. Whilst Descartes thought to be in possession of a direct and positive argument *for* the existence of other minds in the case of human beings, he pointed out that his argument *against* like a claim as regards non-human animals was in fact of a different kind. This asymmetry between the arguments *for* the existence of non-corporeal substances and the arguments *against* it is indeed a crucial feature of Descartes' account of other minds (as, at the next chapter point out, of this theory of bodies). What Descartes though to have proven was not in fact that Pereira was right, but only that traditional Aristotelians were wrong:

> I investigated very carefully whether the movements of animals originated from both these principles or from one only. I soon perceived clearly that they could all originate from the corporeal and mechanical principle, and I regarded it as certain and demonstrated that we cannot at all prove the presence of a thinking soul in animals (*pro certo ac demonstrato habui*, *nullo pacto a nobis probari posse, aliquam esse in brutis animam cogitantem*). I am not disturbed by the astuteness and cunning of dogs and foxes, or by all the things which animals do for the sake of food, sex and fear: I claim that I can easily explain all of them as originating from the structure of their bodily parts. But though I regard it as established that we cannot prove there is any thought in animals, I do not think it can be proved that there is none, since the human mind does not reach into their hearts (*mens humana illorum corda non pervadit*).[46]

[45] To Elisabeth, 6 October 1645; AT IV 314-15; K 272 (for a more detailed analysis of this text, see §15).

[46] To More, 5 February 1649; AT V 276; K III 365. Especially in his latest works and always with gritted teeth, Descartes admitted that quite a good deal of physical phenomena can be accounted for in many different ways, so that finite beings can only attain a *moral* certainty concerning the physical process actually at work; cf. *Principia* IV 204-206; AT VIII-1 327-29. But since Descartes' claim that there are no arguments in favor of the existence of a mind in non-human animals depends on an exhaustive knowledge of the entire body of physics, it would seem to follow that the "certainty" mentioned by Descartes in his letter to More is only of the moral kind. In order for Descartes' argument to work it is however enough that there is *at least one* set of physical explanation of all physical

The reason why Descartes concluded that non-human animals do not have a mind was not indeed that their soul would have had to be intellectual on a par with men's, or immortal, as men's souls would have hopefully turned out to be. The reason why Descartes reached this conclusion is not even that all mind's activities *must be* unaccountable in physical terms, so that the complete explanation in physical terms of the entire animal behavior would immediately imply that they lack a mind. Descartes did not in fact see any metaphysical contradiction between the mind being free and all of its action being also accountable in physical terms, this being precisely the scenario envisaged in the late *Annotations to the Principles* already discussed in the previous chapter. Descartes, though, thought that *as a matter of fact* this is not the case *as far as we human beings are concerned*. As for beings other than humans, on the other hand, Descartes would still have insisted that such a claim is temerarious. Temerarious, however, does not mean wrong. The fact that animals, contrary to human beings, do not make an "exception" to the "ordinary course of Nature" does not therefore exclude by itself that non-human animals too have a mind.

The true reason why Descartes refused to ascribe a mind to non-human animals is indeed because he took himself to have established that there was and there would never be reasons to do so. According to Descartes the concept of an animal soul is not contradictory, or too difficult to swallow: it is just useless. If brutes too had a mind, we would still be unable to look directly into it, "to reach into their hearts". Anyone of use is in the same situation in front on any other fellow human being, but in this case the actions they perform and the statements they make prove that they must in fact have a non-material principle of action, a willing mind. An animal mind, on the other hand, was for Descartes undetectable both from the first- and from the third-person perspective and devoid of any explanatory role. For Descartes the souls of non-human animals were indeed just redundant if not outright chimerical entities that *could* and in point of fact *had to be* cut out and throw out of philosophy. Once Descartes put down his scalpel and razor the only soul he took to be left was indeed the soul of the ζῷον λόγον ἔχον – the intelligent mind.

The logic of Descartes' argument was perfectly understood by his first readers. In his *Commentaire ou Remarques sur la Méthode de Rene Descartes* (1670), Poisson made indeed clear that

phenomena. The existence of many thereof is undeniably for Descartes a pressing epistemological issue, but has no consequences for his theory of animal minds: according to Descartes such a plurality of mechanistic accounts of physical phenomena – and, thus, of animal behavior – does not indeed prove that Aristotelians were right, but only that they could be wrong in many different ways.

Descartes "ne nie pas que les animaux n'ayent pas d'ame spirituelle: mais il dit seulement qu'on ne peut par prouver qu'ils en ayent".[47] Already eight years before, however the just-mentioned first publisher and Latin translator of the *Traité de l'Homme* presented Descartes' argument in these terms:

> Since beasts are not able to speak and thereby communicate their latent thinking and no one ever come upon their private thoughts and deliberations; and since moreover all their actions are material – they are, that is to say, just movements of their limbs… it follows that those who try to deduce therefrom [the existence of] cognitive souls in beasts, are making unwarranted inferences and multiply entities without necessity.[48]

"Nemo unquam intimis illarum cogitationibus aut consiliis intervenit", wrote Schuyl in 1662. At the moment of translating this passage into French, the editor of Descartes' correspondence immediately went to his mind to the "mens humana illarum corda non pervadit" of Descartes' 1649 letter to More (already edited in 1657) and tried to make the best of the two passages. In his 1664 French edition of Descartes' *Traité de l'Homme*, Clerselier explained thus that there were no reasons to ascribe a soul to non-human animals on their basis of their actions, and that therefore there were no reasons at all to posit like entities. If beasts too had in actual fact a mind remained ultimately undecided and undecidable, since "personne n'a jamais penetré dans le fond de leurs cœurs".[49] Descartes, as well as Schuyl and Clerselier, would have remarked that we should not however complain about our ignorance on the matter. They thought, indeed, that we knew everything that there was to know in order to make sense of the "ordinary course of Nature" as well as on the only minds that make an "exception" wherein the big machine of the universe, the only truly exceptional minds. Our own.

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[47] Nicolas-Joseph Poisson*, Commentaire ou Remarques sur la Méthode de Rene* Descartes (Vandosme: Hip 1670), 149-50.

[48] Florent Schuyl, *Preface* to Descartes' *De homine*, p. xvii (not numbered): "Quia igitur bestiæ loqui nequeunt, quo latentem suam cognitionem prodant, & nemo unquam intimis illarum cogitationibus aut consiliis intervenit: atque omnes ipsarum actiones materiales sive membrorum commotiones sunt... sequitur, eos, qui hinc bestiarum animas cognoscentes deducere conantur, plura inferre, quàm probârunt: & entia citra necessitatem multiplicare" (my translation).

[49] Cf. *L'Homme, & un Traité de la formation du fœtus*, 404: "Et puisque les bètes ne sauraient parler pour donner à connaître leurs pensées, & que personne n'a jamais pénétré dans le fond de leurs cœurs ni assisté à leurs conseils, & que toutes leurs actions sont matérielles, c'est-à-dire ne sont autre chose que des mouvemens corporels… il s'ensuit manifestement que ceux qui de là veulent inférer que les bètes ont une âme qui connatt, infèrent plus qu'ils ne doivent, & qu'ils multiplient les êtres sans nécessité".

[§§21-28] Arguments *against*: The Case of Colors

The fisherman is all
One eye, in which the dove resembles a dove
…
State the disclosure. In that one eye the dove
Might spring to sight and yet remain a dove.

Thinking of a Relation Between the Images of Metaphors
Wallace Stevens

As shown in the first part of this work, Descartes thought he had a purely philosophical argument (based on both phenomenological and metaphysical considerations) to prove that material objects are extended. Material objects would accordingly have a shape and be in motion or at rest in relation to each other. All these properties, Descartes claims, simply derive from their being "extended things". In Descartes' views, on the other hand, the fact material objects are extended does not and cannot establish by itself whether shape and the like are the only properties to be ascribed to bodies. Whether, that is to say, material bodies are *nothing but* extended things or one should list among their properties also colors and all remaining sensible qualities posited by the Scholastics (such as hotness, or weight). According to Descartes, neither phenomenology nor metaphysics can in fact resolve on the traditional claim according to which material objects would be red or blue for real, so that "redness" (*rubedo*) and like features too would have to be listed among their physical properties, perfectly on a par with their having a shape.

What Descartes took himself to have demonstrated on purely philosophical grounds was a much weaker claim, namely, that sensory ideas *must not* represent the objects they are about precisely as they are. Descartes had concluded the *Meditations* by arguing that the experienced differences between color-perceptions do indeed *correspond* to real differences in the physical constitution of the material objects these perceptions are about. In Descartes' views, it remained however to be determined whether the experienced difference between (say) the sensation of red and the sensation of blue simply results from one body's *being red* and another's *being blue* – from their respective "redness" and the "blueness" – or from some other physical properties, which had yet nothing to do with colors (such as a difference in the surface texture of the two bodies). Descartes argued that, in case the physical properties represented by these color-

sensations would have turned out to reducible to shape and motion (as is the case for the texture of a body's surface), it should have to be concluded that material objects are indeed *nothing but* extended things. And this is in fact what they really are, according to Descartes. What has been said so far should however have made clear why, in order to establish this claim, Descartes thought one had to move beyond the 'first philosophy' of the first book of the *Principles* and of the *Meditations*, which conclude in fact with a profession of ignorance on the topic.[1]

Descartes intended to prove that the only properties material objects have is indeed to be of a certain size, shaped in one way or another, in motion or at rest, by relying on a 'natural philosophical', argument, chiefly grounded on his account of vision and, more specifically, on the physiology of the visual process. Or, at least, so argue the chapters that follow. Descartes' main point against Scholastic "qualities", according to this reading, is that color-perception does not require to ascribe to material objects anything besides extension and its modes. Analogously for the other senses and, more in general, for what Descartes called "toute l'architecture des choses sensibles" – the entire fabric of the world as we experience it to be.[2] In force of the principle of best explanation and metaphysical parsimony, Descartes concluded therefrom that there are in fact no reasons to posit in bodies additional physical properties such as redness, hotness, weight (or, by the same token, entities such as the vegetative and the animal soul, as already shown in the previous chapters).

Contrary to what is normally assumed, the claim that bodies are nothing but extended things is not indeed to be taken as the starting point of Descartes' physics, but as its crowning achievement. It is indeed only once the entire system of natural philosophy is in place that Descartes believe he could proceed to prove this claim, as he pointed out in expounding the argumentative structure of the *Principles* in the already-quoted and all-important letter for Christina of Sweden.[3]

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[1] See again the already quoted *Meditationes* VI; AT VII 81, 17-22; CSM II 56*: "Et certe, ex eo quod valde diversos sentiam colores, sonos, odores, sapores, calorem, duritiem, & similia, recte concludo, aliquas esse in corporibus, a quibus variæ istæ sensuum perceptiones adveniunt, varietates iis respondentes, etiamsi forte iis non similes".

[2] *Recherche de la vérité*; AT X 506.

[3] To Chanut for Christina of Sweden, 26 February 1649; AT V 291-92: "While reading the book, finally, it is mandatory to keep in mind that, although I take into account, in bodies anything but the magnitudes, shapes and movements of their parts, I do nevertheless claim to explain there the nature of light, of heat and of all other sensible qualities. For I assume that these qualities are only in our senses – as tickle and pain are – and not in the objects we sense, wherein nothing is to be found apart from certain shapes and motions, which cause the sensations we name "light", "heat" and so on. I explained and proved this claim only at the end of fourth part of the work,

This line of reasoning predates however both the 1644 *Principles* and the *Meditations*, published three year earlier. Already sketched in the late '20s in the *Rule* devoted to perception (the twelfth), Descartes spells out his empirical argument about the nature of bodies in the 1633 *World, or Treatise on Light* and in the 1637 *Essays*, more specifically in the *Dioptrics* and in the section on colors of the *Meteors*. The mere titles of the works would suffice to prove that Descartes started working out this argument in relation to vision theory. The pages that follow are intended to show that it was indeed precisely by musing on light and color perception that Descartes came to formulate this line of reasoning.

As the next chapters show, the theory of perception – and, more specifically, of vision – was indeed not only historically instrumental in shaping Descartes' 'natural philosophical' argument, but retained all of its importance even once Descartes had started to call into question phenomena that, from a physical point of view, were possibly even more complex than light transmission and nerves physiology. The complexity of the physical and physiological stage of the visual process was arguably one of the main reasons why Descartes devoted more attention to sight than to any other sense. Descartes' first systematic work in physics, as already pointed out, was in fact a *Treatise on Light*, whose nature and transmission were eagerly researched by the scientists of the time, who thought on the other hand to have a pretty firm grasp of the transmission of smells, or sounds (at least if compared to light). The received optical theories had moreover been seriously questioned by some recent findings in physiology, not to mention Kepler, who advanced his alternative account of vision just a few years before Descartes started his researches in the field. On a more philosophical ground, the Scholastic theory of perception opposed by Descartes was throughout based on the concept of *species*, which had been initially worked out to account precisely for vision, and still found in this domain its most convincing applications. It was indeed precisely by construing of the mediating entities of the visual process in terms of "likeness" (*similitudines*) that Aristotelians intended to make sure that the perceiver – in case no error occurs – perceived the object precisely *as it is*, so that color-perceptions could be taken at face value as evidence that objects are indeed colored, and literarily so. Vision challenged therefore like no other sense Descartes' physics and his epistemology. Descartes treated it accordingly. The study of Descartes' argument against color-qualities can thus be taken as the most wide-ranging, compelling and far-reaching case of his 'natural philosophical' argument *in general*, and as the one that better enables to appreciate Descartes' relations to his predecessors (in both positive and negative terms), the argumentative

even though, in order to understand it better, it would be appropriate to notice and to keep notice of it from the beginning of the treatise" (my translation).

strategy of some of his most important works as well as the epistemological and metaphysical implications he intended to draw therefrom.

What follows is therefore not so much intended to expound Descartes' account of the visual process as such, as to analyze Descartes' case that color-perception does neither attest nor demand the presence of any "color-qualities" in bodies, as long as the same experience can be explained by a more austere metaphysics, without positing in bodies any properties besides geometrical ones. More specifically, §§21-23 set the frame for Descartes' argument, by presenting the theories of visual perception he was responding to: the Perspectivists', Kepler's, the late Scholastics' – Rubio's, especially. Descartes' own argument is presented in §§24-27: §24 illustrates Descartes' views on the physiology of the visual process; §25 his account of the mental stage, by specifically focusing on Descartes' theory of an "institution of nature" that he claims to rule the relation between brain and mental states. Drawing from both, §26 will finally be in the position to set forth Descartes' argument against color-qualities. Arguing against a quite standard reading, the concluding §27 shows that, on the other hand, Descartes' theory of a "natural geometry" for vision plays no role in his argument that bodies are *nothing but* "extended things" or, even more simply, that they are *extended* in the very first place.

[§§21-23] Setting the Stage for the Argument: Vision Theories before Descartes

After having demonstrated the formation of an inverted picture on the rear of the eye, the founder of Early Modern optics confessed he had no clues as how this luminous image could be transmitted beyond the retina, through the optic nerves, to the brain. By Kepler's own admission, his account left in fact unexplained the final and ultimate stage of the perceptual process. Early Modern anatomists had in fact discovered that the optic nerves were not hollow and concluded that light could not creep through them by "glowingly travelling though the path of the spirits" as Ancient and Medieval theorists had been happy to assume. Early Modern thinkers were thus faced with the problem of accounting for color experience without counting on a continuous transmission of light and color from the object to the seat of perception in the brain.

Such a transmission, according to the Medieval writers in optics (hereafter referred to as "the Perspectivists") was yet a necessary stage of the perceptual process. Following Aristotle, they maintained in fact that, in order for knowledge to take place, the subject had to apprehend the "form" of the object by getting somehow "similar" to it. And since they denied action at a distance, they concluded that also the mediating entity between the object and the perceiver had to be understood as a "likeness" of the object: its *similitudo* or, as is better known as, the *species*. As for vision, as the sense-modality whose proper object is color, this was taken to demand the actual coloring not only of the external organ (the eye) but even of the brain, inasmuch as this was regarded as the seat of the sensory soul (its "internal" organ). In order for the mind to "assimilate" the object's color, the Perspectivists argued that both the eye and the brain had to become *similar* to the object in a very strong and literal sense, by turning red when faced with a red object. The Perspectivists, accordingly, devised the visual system in a way as to ensure that these conditions could be met: the arrangement of ocular humors and optic nerves they came up with was indeed more of a purely theoretical construct in service of their epistemology than a physiological reality established empirically.

When Early Modern anatomists started pointing out these shortcomings, a few philosophers promptly realized that the ideas of any actual coloring beyond the eyes level had to be abandoned. They still did not think, though, that this was strong enough a reason to give up the general epistemology of assimilation, much as quite a few adjustments were needed as far as the physiological stage of the process was concerned. The thesis that knowledge consists

in the subject apprehending the object *as is*, by having in mind the actual hue of the external body (the perceived and the physical red being one in kind), was in fact taken to have so many arguments in its favor that the discovery of some nervous fibers could not possibly call it into question.

A few ways out of the predicament were proposed. Antonio Rubio, for example, argued that the *species* impressing the sense-organs, albeit non-similar to the object's quality it represented, was nonetheless "naturally designed" (*naturaliter ordinata*) as to make the cognizer perceive precisely that one quality, so that the cognizer could properly perceive red when presented with a red object, notwithstanding the existence of a gap in the assimilation process. As the Perspectivists worked out a visual system consistent with and instrumental in substantiating the assimilation model, so the Scholastics stipulated a "natural design" that could uphold this epistemological doctrine once the Perspectivists solution had failed.

Descartes, however, became convinced that the problem of a transmission of light and color *per opaca corporis ad Animæ penetralia* ("through the opacities of the body up to the inner cell of the soul", as Kepler graphically phrased the conundrum), could not be eluded as a matter of stipulation, by simply *assuming* that sensory ideas represented bodies *precisely as they are* (in case no perceptual error occurs). In Descartes' view the difficulty Early Modern optics had stumbled upon, albeit apparently marginal and confined to this discipline alone, was calling into question the face-value reliability of sense-perception, the metaphysical theory of bodies and the very concept of truth. Insoluble as it was with the old conceptual tools, this puzzle called for a shift in paradigm.

Descartes' line of reasoning and the novelty of his claims can of course be appreciated only in relation to his predecessors. The next chapters are thus devoted to setting the frame of Descartes' argument, by presenting the main accounts of vision he was responding to. Accordingly, §22 focuses on Descartes' "first teacher in optics": Kepler. §23 examines Antonio Rubio's commentary to Aristotle's *De Anima*, the text through which Descartes was arguably introduced to the Aristotelian theory of the *species*. During the years, however, Descartes also became acquainted with the original formulation of this doctrine, which despite being much older (dating back to the second half of the 13th century) was still extensively studied and largely received. Witelo's *Opticae libri decem* would indeed be still referred to by Descartes as a paradigm for science in the late 1630s, and the influence of Roger Bacon's *Perspectiva* (published in 1614

in Frankfurt) was immediately pointed out by the first readers of the *Dioptrics*.[1] The Perspectivists' account of vision is therefore the subject-matter of the opening §21.

[1] See, respectively, To Mersenne, 27 May 1638; AT III 141-42 and To Mersenne, November or December 1638; AT II 447.

§21. The Perspectivist scheme

Bringing together Aristotle's claims that, for knowledge to obtain, the subject must grasp the "form" of the object by getting in some way *similar* to it and that no action takes place at a distance, from the second half of the 13th century onwards most philosophers came to conceive of the cognitive process as the "assimilation" of a likeness issued from the object. In the case of sense-perception, in particular, the purely passive reception of this *similitudo* was intended to warrant that the subject could apprehend the object the way it is. The subject's contribution to the cognitive process was kept to a minimum, and intentionally so, since any interfering on his part could have done nothing but distort the faithful transmission of such a likeness. There were actually thinkers who, mostly driven by metaphysical concerns about causality, contended that the subject must still somehow enter into this process or that denied the need – sometimes even the sheer possibility – of any *similitudo* being issued from an object.[1] None of them, however, went so far as to deny that knowledge, in general, (and, thus, sensory knowledge too) consists in the cognizer grasping *as such* the form of an object: for a perceiver to know that something is red it was indeed argued that he therefore to have in mind (quite literally) the object's color. How this was exactly to be understood was, of course, fiercely debated. The standard claim according to which red would not be in the mind the way it is in the object, but there only "intentionally", cried out right away for a general theory of intentionality. Medieval thinkers worked them out at dozens, with remarkable sophistication even around the minutest points.[2] Yet, virtually all of them agreed that, even though red exists in two altogether different manners, as in the object and as in the mind, these were still different modalities of being of *one and the same* color. Indeed, its mode of existence had to be two-fold precisely in order for the very same red to be at once in both places, both in the world out there, and in the mind. The object to be perceived and the perceiver are nonetheless two different things, so that it was still to be explained how the former could act upon the latter, all the more if some space was intervening between the two. To bridge this gap, most philosophers posited the above-mentioned *similitudo* as a sort of mediator.

[1] See, respectively, José Filipe Silva – Mikko Yrjönsuuri eds., *Active Perception in the History of Philosophy: From Plato to Modern Philosophy* (Dordrecht: Springer 2014); Katherine H. Tachau, *Vision and Certitude in the Age of Ockham* (Leiden: Brill 1988).

[2] For a critical presentation of the main theories on the topic, see Dominik Perler, *Theorien der Intentionalität im Mittelalter* (Frankfurt am Main: Klostermann 2002).

They distinguished, more in detail, between a *species in medio*, a *species sensibilis* and a *species intelligibilis* (*species* and *similitudo* being for these authors perfectly equivalent terms).[3] The first was said to propagate from the external object to the perceiver by travelling through a medium which, in the case of vision, had to be transparent in order for this transmission to take place. Under this regard, this same *species in medio* could be appealed to also to explain merely physical (i.e. non-perceptual) process, such as the warming up of a stone because of the light rays falling upon it. Once this *species* travelling through a transparent medium – mostly air, or water – entered the eye, though, the sensitive surface of this organ was said to "register" it. Or, to cast the issue in another way, the *species in medio* was said to impress the crystalline lens, thereby bringing about what Scholastic authors sometimes called the *species in organo*.

The impression so formed at the level of sense organs was also referred to as the *species sensibilis*, as it was precisely this impression that enabled the subject to attain *perceptual* knowledge – i.e. to see a color. According to the promoters of this view, the *species* itself was not perceived, but had to be postulated in order to account for the cognitive process. In Aquinas' terms, indeed, the *species* – all sorts of *species* – are not the ultimate object of knowledge, *what* is known (*id quid cognoscitur*), but *that by means of which* one comes to know something (*id quo cognoscitur*) – in the case of sense-perception, an external object.[4] Intentionality was not in fact taken (not primarily, at least) as a *positive* feature of the representative entity, as the inner structure by means of which the *species* directs the perceiver to the object. If the *species* let the object be perceived, it was maintained, this was only because the *species* itself could not be perceived. Being intentional, for a *species* (they were indeed often referred to as *species intentionales*) did not mean so much that the *species* was *about* an object, as it implied that this representative entity was somehow *inferior to* the object from a metaphysical point of view. It was indeed precisely because of this lesser, not fully-fledged form of existence that according to the proponents of this theory the *species* could escape perception, and work as an intermediary of the perceptual process. Scholastics, therefore, and especially late Scholastics, insistently pointed out that the *species* only possesses a "diminished", if not badly "degenerated" form of existence (*esse diminutum, esse degenerans*), despite the difficulties to make proper sense of this way of speaking.

Intellectual cognition too was usually said to require an analogous mediating entity, the so-called *species intelligibilis*, that the agent intellect would form on the basis of the *species sensibilis* or,

[3] Bacon, *Perspectiva* I 5, 1; Lindberg 61: "the similitude of an agent is nothing but a *species*, as everybody knows" (*similitudo agentis non est nisi species, ut omnes sciunt*).

[4] Cf. Thomas Aquinas, *Quæstiones disputatæ de anima* 2 ad 5; *De Veritate* 2.6; *Summa contra gentiles* 2.75, 4.11; *Summa theologiæ* Ia.85.2.

more precisely, on the basis of the *phantasma* that integrated the manifold *species sensibiles* coming from one object, as for example the white and the sweet of the milk. By means of this intelligible *species* the cognizer – more precisely, the possible intellect – was said to be finally able to apprehend the essence of the object. The *species*, it was claimed, would indeed contain "encapsulated" (or "encoded") right from the beginning the object's essence as its representative content (for more on the Scholastic notion of representation, see below §25).

The theory of a *similitudo* was indeed so constitutive a piece of most Aristotelian-minded theories of cognition to still feature in quite a few philosophies of the 17th century, especially among the Jesuits. Indeed, the most up-to-date text on the topic available to Descartes during his school years in La Flèche still defended the view that

> the sensory power, before being acted upon by the object by receiving a likeness (*similitudo*) of it, is dissimilar to the object. It becomes similar to it, however, by receiving an image (*species*) of the object, since the sensory power has in itself, at present, a likeness (*similitudo*) of the object, that somehow represents it, and by virtue of which the sensory power is believed to have in itself almost the object itself and, thereby, is made similar to it.[5]

The shift from *similitudo* to *species*, clearly used by Rubio as perfect synonyms, is remarkable but, as already explained, by no means idiosyncratic. The concept of a "likeness", although already outlined by Aristotle himself, gained prominence during the 13th century precisely under the influence of vision theory, which was specifically concerned with the transmission of *visual* likeness, referred to as *species* by the theorists in the field. The word comes in fact from the verb *spectare*: "to watch". Accordingly, the science of vision – and thus, more in general, of the propagation of *species* – was named *perspectiva*. The translation, around 1200, of the masterpiece on the topic, Ibn al-Haytham's *Kitab al-Manazir*, the "Book on Optics", written in the first decades of the 11th century, is in fact a watershed in European intellectual history. The heyday of Alhacen's *De aspectibus* ("On Visual Appearances"), as the work and its author came to be known in the Latin-speaking world, was between 1260 and 1280, when Roger Bacon (ca. 1214-1294), Erazm Ciolek Witelo (ca. 1230-post 1280/ante 1314) and John Pecham (ca. 1240-1292) wrote their own treatises on optics, for the most part some more or less creative appropriations

[5] Antonio Rubio, *Commentarii in libros Aristotelis Stagyritæ (…), de Anima* (Lyon: Pillehotte 1613), 205: "Aristoteles… docuit id quod patitur in principio esse dissimile agenti, sed in fine simile, & ita potentia sensitiva in principio hoc est, antequam patiatur ab objecto recipiendo similitudinem eius, dissimile est ei, sed per receptionem eiusdem speciei fit similis, quia habet iam in se similitudinem obiecti ipsam aliquo modo repræsentantem, ratione cuius quasi ipsummet objectum in se habere censetur, & ex eo facta est ei similis".

of Alhacen's results.[6] It is mainly because of these works and the responses they elicited that the theory of *species* came to take hold in Europe. During the second half of the 13th century, furthermore, the meaning of *species* broadened as to encompass the "likenesses" of *all* sense-modalities, by almost forgetting the etymology of the term.[7]

The so-called "Perspectivists" (*perspectivi*) had made their own the core claims of Aristotelian epistemology as well as the metaphysical framework wherein this epistemology operated, conceiving of bodies as composites of matter and form (the cognitive process being only about the latter). Not much engrossed in metaphysics, they took on the other hand great pains to spell out how this assimilation was precisely to work at the level of sense-organs, in the attempt of putting flesh – literally – on the claim that "a *species* produced by a visible object has the essential property of manifesting the object of which it is the likeness (*similitudo*)".[8] Aristotle himself, actually, already argued that the eminently abstract tenet that wants knowledge to consist in the assimilation of the object's form had to be fleshed out for each sense-modality in order to be adequately substantiated. And so he did in his psychological writings. The Perspectivists, however, could no longer accept Aristotle's specific solutions to the problem, which in the meantime had proved inadequate, when not outright mistaken, as in his locating the "seat of perception" in the hearth, rather than in the brain. The authority to be followed in the domain of anatomy and physiology was in fact Galen. As a matter of fact, the synthesis between his theory and Aristotle's represents one of the most important episodes in the history of Medieval psychology.

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[6] The analysis of the Perspectivist Scheme that follows does not take as its leading thread Ibn al-Haytham's, Roger Bacon's, or Witelo's advanced treatises but the more elementary and way more widespread synthesis of their works presented by Pecham. As a Cracow manuscript of the early 15th century makes clear, it was indeed because of these features that Pecham's work was qualified as the "common" treatise in vision theory: "It can be called *Perspectiva communis* because the doctrines commonly maintained [or maintained in common] by the perspectivists have been collected here"; cf. Lindberg 13-14.

[7] See for example James of Viterbo (1255-1308), *Quodlibet* 1, q. 13; ed. Ypam 1968, 184. The passage is discussed in José Filipe Silva, "Medieval Theories of Active Perception: An Overview" in José Filipe Silva – Mikko Yrjönsuuri eds. *Active Perception in the History of Philosophy* 135-40. But see already Grosseteste, "De lineis, angulis & figuris" 60: "Agens naturale multiplicat virtutem suam a se usque ad patiens, sive agat in sensum, sive in materiam. Quæ virtus aliquando vocatur species, aliquando similitudo, & idem est, quocumque modo vocetur"; *Die Philosophischen Werken des Robert Grosseteste, Bischofs von Lincoln* (Münster: Ascherdorff 1912).

[8] John Pecham, *Perspectiva communis* II 5; cf. David C. Lindberg ed., *John Pecham and the Science of Optics* (Madison: University of Wisconsin Press 1970), 161: "species genita a re visibili essentiali habet rem ostendere cuius est similitudo". The Latin of the sentence, it must be admitted, does not run very smoothly, but Lindberg's translation seems to have captured its intended meaning.

Aristotle's and Galen's accounts dovetailed in fact quite reasonably under many respects, but were completely at odds over vision. Aristotle, indeed (at least in his mature writings), maintained that vision takes place when the "form" of an object, after travelling through a transparent medium (air, or water), *enters* the eye. The eye itself, moreover, must be transparent – it is indeed watery – in order to *take in* this form.[9] Galen, on the other hand, adopted a Platonic and Stoic model, arguing that vision does not occur because of the intromission of anything into the eye (neither of a "form", nor of some atoms), but that was rather sight to *reach out* to the external body. This happens thanks to a qualitative change induced in air by the visual *pneuma*, later to be rendered in Latin as *spiritus*. For Galen, this mixture of air and fire would flow from the brain, through the optic nerves, to the eye, to eventually come out of it by turning the air intervening between the eye and the outer object into a sort of extension of the optic nerves. Under the action of visual spirits, Galen claims, "air becomes for the eye the same kind of instrument… as the nerve is for the brain".[10] Galen's point was openly to establish a continuous link between the object and the "seat of perception" in the brain: in order for the subject to perceive a color. For Galen, in order for the perceiver to perceive his brain had in fact to be in contact, via the spirits, to the colored object. But since according to Galen any interruption of this transparent pneumatic link would have cut off the visual process, he concluded that the optic nerves *must* be hollow (whether this is the case – it turns out that is not – will be discussed in the following chapter).

Despite the tremendous impact of Galen's writing on his psychology, Avicenna joined his contemporary Alhacen in rejecting any account of vision based on extramission models – nor were they the first ones to do that. Their arguments and their authority led Latin Perspectivists to unanimously embrace intromission as the proper explanation of the visual process, although not without tensions and ambiguities (as a matter of fact, some mathematicians and quite a few anatomists kept on embracing extramissionism till the 16th century).[11] They kept in place Galen's appeal to the spirits, though, as they kept in place Galen's demand of an uninterrupted bridge

[9] For Aristotle's mature theory of vision, see *De Anima* B 7, 418a27-419b3. *De Sensu* 437a15-440a25.

[10] Galen, *De placitis Hippocratis & Platonis* 7. 5, trans. De Lacy; cf. *Opera omnia*, ed. Kühn 5: 625; quoted in David C. Lindberg, *Theories of vision from al-Kindi to Kepler* (Chicago - London: University of Chicago Press 1976), p. 219 n. 65.

[11] See for example Pecham, *Perspectiva communis* I 46 {49}; ed. Lindberg 129-30. On the extramissionist elements in the Perspectivists' account, see Lukáš Lička, "*Non sicut mus de foramine*: Some 13th Century Approaches Towards the Extramissionist Explanation of Vision" in Elena Baltuta ed., *Theories of Sense-Perception in the 13th and 14th Centuries* (forthcoming). For a general presentation of 16th century extramissionist account of vision see Sven Dupré, "Kepler's Optics without Hypotheses", *Synthese* 185/3 (2012): 501-25.

between the external body and the *brain*, at any rate, which they regarded it (and rightly so) as nothing but the consequent extension of Aristotle's call for a continuous stretching of a transparent medium between the object and the *eye*. Whether the visual process was directed from the object to the subject or the other way around was indeed subordinate to the communal concern of filling the gap between the two.

Blending Aristotle with Galen, the Perspectivists thus argued that the *species* of red, issued from a red object, travelled through the medium, entered the eye, was channeled into the hollow optic nerve to finally color the brain – *ad litteram*:

> *Light and color are apprehended by naked sense.*
> For they are apprehended only because they tinge the ultimate sense.[12]

Actually, since the sensibles apprehended "by naked sense" are two, Witelo distinguished between *two* different (albeit related) physical alterations of the sense-organs:

> The ultimate sense, which is in the common nerve, apprehends light because the common nerve gets illuminated, as it apprehends color because the common nerve gets colored, since the forms [i.e. the species] of light and color travel through the common sense and get impressed on it.[13]

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[12] Pecham, *Perspectiva communis* I 58[a] {61[a]}; Lindberg 139: "*Lucem & colorem comprehendi sensu spoliato*. Per hoc enim tantum apprehenditur quia ultimum sentiens iis tingitur". Reworking Aristotle's distinction between proper and common sensibles, the Perspectivists distinguished indeed between a class of visibles (constituted by nothing but light and color) that were apprehended merely as a result of an alteration of the sense-organs and another class of visible features, which on their views required "discernment, inference and recognition" in order to be experienced. Cognitive activities of this kind, according to the Perspectivists, proved to be needed even in order to apprehend even visibles apparently as elementary as position and transparency. In comparison, light and color were thus be said to be perceived by "naked sense": by the sense of vision by itself, namely, divested of the "the cooperation of argumentation and the discriminative faculty" required for all other visible features; John Pecham, *Perspectiva communis* I 56 {59}; ed. Lindberg 136-37. Cognitive operations of this kind were in fact attributed to higher cognitive faculties (which ones exactly was a matter of contention that does not need to concern us at present: I deal with the topic in my "*Sensus spoliatus:* The Perspectivists' Distinction between Proper and Common Sensibles"). The issue will be addressed in §27, whereas in what follows (unless otherwise stated) the only visibles taken into account will be light and color.

[13] Witelo, *Opticæ thesaurus… Vitellionis thuringopoloni Opticæ libri decem* (Basel: Episcopios 1572), III 22, 95: "Sentiens itaque ultimum, quod est in nervo communi, comprehendit lucem ex illuminatione corporis huius & colorem ex eius coloratione, quoniam horum formæ transeunt & figuntur in ipso". For Bacon see at least *De multiplicatione Specierum* I 1; Lindberg 9-11.

The claim that light and color are apprehended merely as a result of a getting illuminated and colored of the eye and, subsequently, of the optical chiasm should not however be taken as an instance of crude materialism. According to the Perspectivists what gets colored is not in fact a material object whatsoever, upon which some light rays happen to fall. In their views, it is indeed nothing but this capability to apprehend colors to turn formless matter into the organ of a living being. Therefore, as Aristotle had already made clear, an eye ceases to be an eye as soon as is no longer able to see (as in a dead animal). No matter how accurate a reproduction of the exterior features of this organ would be, for Aristotelians such an apparatus of lenses could not be called an "eye", since what makes the eye an eye is nothing but its *function* – its capacity to apprehend colors, namely – not the arrangement of its parts. As Aristotle vividly put it, "if the eye were a living being, its soul would be its vision".[14] By the same token, Aristotle argued against atomism (and, more in general, any materialistic-minded psychology) that vision does not amount to the mere mirroring of an image on the eye – nor, analogously, to the simple formation of an image within the eye because of reflection or, by the same token, refraction.[15] The eye, however, should not even be taken as a sort of mirror to which is accidentally attached a sensory soul, since an eye (and, more in general, a perceiving organism) is what it is precisely by virtue of the sensory soul. For any rigorous Aristotelian, the coloring of the eye and the perception of this color are in fact one and the same thing. If something gets colored and yet does not perceive this coloring, this thing is simply not an eye, for the eye is by essence the organ that apprehends color.

At the end of the day, the thesis that the eye – and, subsequently, the *ultimum sentiens* – must get colored for color perception to occur amounts therefore to the very reasonable claim that the sense organ must be impressed by the object if it is ever to perceive it, together with the specification that, in the case of vision, this sensory impression is – not very surprisingly – a pictorial impression, namely, an image made of colors. Therefore, for the eye to be impressed by this image, the eye itself must take in its colors, and it must do it in an orderly manner, in order not to blur them. By the same token, a hand immersed in water does turn cold and wet, and it is only by becoming itself wet and cold that it can apprehend the tactile qualities specific of the water element (coldness and wetness). All senses would be, under this regard, on a par.

Some Scholastic philosophers – most notably of all, Aquinas – resisted this parallelism and argued for a hierarchy of the senses, proceeding from the deepest-seated in matter to the less material one: from touch to sight. According to this theory, in the visual process the eye (and

[14] *De anima* B1, 412^{b}19-20: εἰ γὰρ ἦν ὁ ὀφθαλμὸς ζῷον, ψυχὴ ἂν ἦν αὐτοῦ ἡ ὄψις. *Ibid.* 412^{b}10-22.

[15] *De Sensu* 438^{a}5-13.

thus, *a fortiori*, the ultimate sense) would undergo no physical alteration (such as the coloring of the crystalline lens), but only a "spiritual" change.[16] Consequently, philosophers like Aquinas argued that color is not transmitted by a transparent medium the same way hotness and coldness by the animal's flesh (by its nerves, for the ones who followed Galen). Taking their cue from Aquinas, some interpreters – most notably of all, Burnyeat – had actually come to point of arguing that this had already been the case for Aristotle, whose texts seem yet to speak forcefully in favor of an actual coloring of the eye and, more generally, of a properly *physical* change of the sense organ for all senses.[17]

The main reason why some Scholastics introduced such an asymmetry was the Neoplatonic metaphysics of light, which conceived of it as a sort of intermediate between material and the immaterial world or, more precisely, as the "emanation" of the latter that gives rise to the former, following a top-down causation that would have eventually come to an end with matter (and, analogously, as far as perception is concerned, with touch). Aristotle himself, indeed, never defended any like a hierarchy of the senses.[18] For Aristotle too, it must be admitted, light was not a body or a quality a body might come to have. Light, in his words, was the "actuality of the diaphanous" – of the transparent, that is to say – only this being a property of air and water, among the elements, as well as of some mixed bodies (glass, for example).[19] Although Aristotle's theory of light does not naturally lead to a (physical) inquiry into the properties of light, it did not rule out its possibility either, though: Aristotle himself, actually, wondered in his writings

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[16] Cf. Thomas Aquinas, *In quator libros Sententiarum* IV, 44.2.1.3c [= *Summa theologiæ* 3a sup. 82.3]. See also *Summa theologiæ* 1a 78.3c; *Quæstiones Disputatæ de veritate* 21.33; *Sentencia Libri De Anima* II.5-60-68 [sec. 283]. On how to exactly interpret these passages, see Myles F. Burnyeat, "Aquinas on 'spiritual change' in perception" in Dominik Perler ed., *Ancient and Medieval Theories of Intentionality* (Leiden: Brill 2001), 129-53. I discuss the topic more closely in my already quoted "*Sensus spoliatus*".

[17] Cf. Myles Burnyeat, "Is an Aristotelian Philosophy of Mind Still Credible? A Draft" in Martha C. Nussbaum – Amélie Oksenberg Rorty eds., *Essays on Aristotle's* De Anima (Oxford: Clarendon Press 1992), 15-26. "What Happen When I See Red and Hear a Middle C" in Martha C. Nussbaum – Amélie Oksenberg Rorty eds., *Essays on Aristotle's* De Anima (Oxford: Clarendon Press 1995^2), 421-34. Burnyeat's reading has been notoriously contested by Richard Sorabji, "Intentionality and Physiological Processes: Aristotle's Theory of Sense-Perception", *Ibid.* 195-225. "Aristotle on Sensory Process and Intentionality: A Reply to Myles Burnyeat" in Dominik Perler ed., *Ancient and Medieval Theories of Intentionality*, 49-61. See also Raphael Woolf, "The Coloration of Aristotelian Eye-Jelly: A Note on *Dreams* 459b-460a" in *Journal of the History of Philosophy* 37/3 (1999): 385-91.

[18] Burnyeat, "Aquinas" p. 131 n. 10. Burnyeat himself makes clear that the hierarchy of the senses in terms of their "purity" advanced in *Eth. Nic.* X 5, 1175^{b}36-1176^{a}1 is "ethical, not physical", and largely propaedeutic to a parallel ranking of the pleasures taken in exercising them.

[19] Aristotle, *De Anima* B 7, 418^{b}3-419^{a}15.

about the epistemological status of the discipline and the proper metaphysical status of light rays. Not so the Neoplatonists who, on the other hand, tried their best to widen as much as possible the metaphysical gap between light and matter. Some of their philosophical tenets and of the doctrines they informed played undeniably a pivotal role for the development of optics: the Neoplatonist theory of radiation figures for example as a key premise of Ibn al-Haytham's account.[20] On the other hand, though, the Neoplatonic metaphysics of light, together with the general theory of perception of this philosophical movement, resulted in hierarchy of the senses and, even more importantly, in a de-materialization of the perceptual process (as convincingly shown by Sorabji).[21]

The Perspectivists too could sometimes defend the supremacy of sight over the other senses – and, thus, the dignity of their science – by appealing to the superior metaphysical nature of light. Howeber, they still were unanimous in claiming that both the eyes and the *ultimum sentiens* had to undergo a proper *physical* change in order for vision to occur, vision being perfectly on a par with all other senses under this regard. The practitioners in the field endorsed this thesis for centuries, until precisely around Descartes' time the celebrate experiment with the cow eyes definitely proved them right (although in some very unexpected way; more on this below). The Perspectivists and their followers credited in fact light with a robust causal activity within the visual process, rather than conceiving of it as a mere *catalyst* of a transparent medium that enables a subject to perceive colors as the case for Aristotle. Their understanding of what vision is about changed accordingly. Whereas Aristotle mentioned nothing but color as the first and proper object of vision – i.e. as the only sensible proper to sight – Ibn al-Haytham and his followers argued in fact that light itself can be perceived (although not in its own right, but always as a *colored* light). Pecham lists accordingly both *lux & color* as the proper objects of sight, as Descartes will still be doing more than three centuries later.[22]

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[20] On the importance of Neoplatonic metaphysics for Medieval and Early Modern vision theory, see David C. Lindberg, "The Genesis of Kepler's Theory of Light: Light Metaphysics from Plotinus to Kepler", *Osiris* 2 (1986): 4-42.

[21] Richard Sorabji, "From Aristotle to Brentano: The Development of the Concept of Intentionality" in Henry Blumenthal – Howard Robison, *Aristotle and the Late Tradition. Oxford Studies in Ancient Philosophy* (1991): 227-59.

[22] Cf. *Dioptrique* VI; AT VI 130, 21-22. Aristotle, to be fully accurate, also mentions as the proper object of sight "something which can be described in words, but has in fact no name" (*De Anima* B 7, 418^{a}27-28), which proves yet to be what is perceptible in the dark. Parts of the examples he gives could be explained as phenomena of phosphorescence (419^{a}3-6). Not all of them, though: see *De Sensu* 437^{b}6-7.

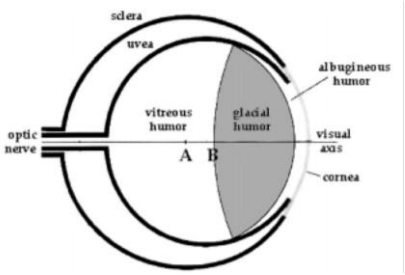
The specifics about how the Perspectivists intended to ensure that the eye and the *ultimum sentiens* could be tinged with the object's color are too sophisticated to be adequately addressed here. Their explanation comes in two main stages:

(i) from the object to anterior surface of the crystalline lens – what they also called the "glacial humor. And, hence,

(ii) from the rear surface of this lens to the brain.

As for stage (i), the main concern was to make sure that the *species*, in entering the eye, would not be blurred. As for (ii), that this same *species* was channeled in proper upright order into the hollow optic nerve up to the *ultimum sentiens*.

In order to solve the former problem, the Perspectivists' strategy was basically to argue that, of the manifold light rays impinging on the eye from everywhere, only the ones perpendicular to its utmost surface – the cornea – being unrefracted, could pass though finding their way to the crystalline lens (at least as far as direct vision is concerned). Since only the rays striking perpendicularly the eye's surfaces were said to get admittance through them, it follows that all the surfaces before the crystalline lens, as well as the anterior surface of the lens itself, had to be concentric.[23] The technicalities of this solution were open to debate and the scholars in the field were fully aware of the disagreements on this topic between, for example, Alhacen and Pecham, and they pointed them out with accuracy. Different manuscripts, moreover, worked out alternative diagrams for the very same work (sometimes also because of textual variances). Interesting as they might be for the history of eye physiology, the differences between these texts, as well as between their diagrams, never call into question the alleged concentricity of all anterior ocular surfaces.[24]



[23] Pecham I 33 {36}; Lindberg 119.

[24] See, for example, the Erfurt manuscript of Pecham's *Perspectiva* (second half of the 14th century) reproduced in the Lindberg edition (plates 3a-3b).

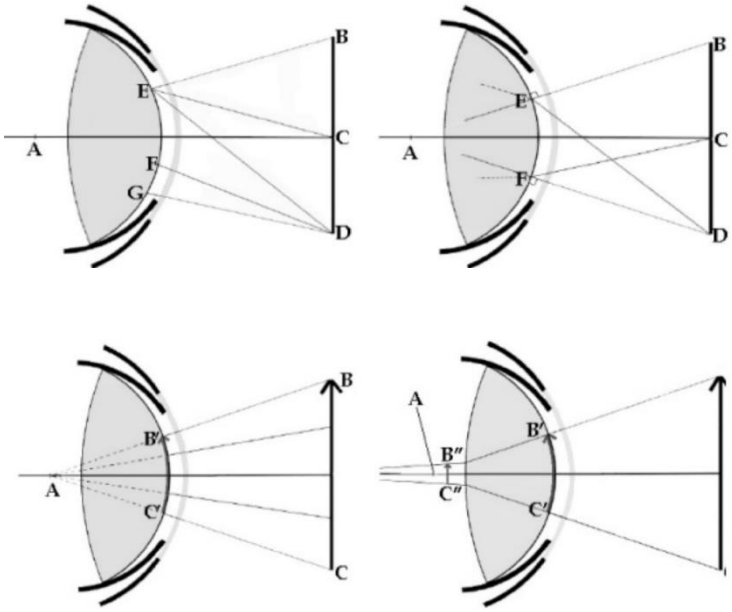
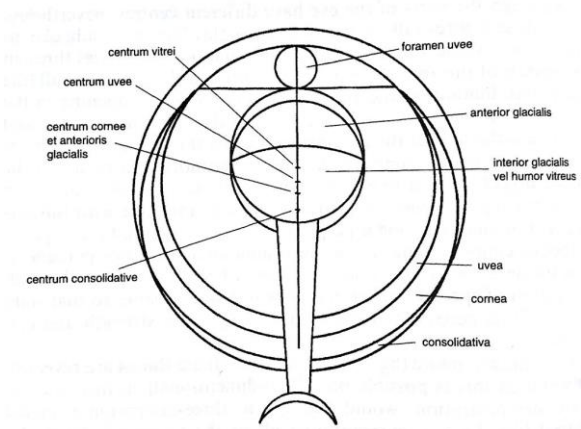


Fig. 1.1: The Perspectivist model of the eye. Every point reflects light rays in every direction (fig. 1.2), but only the ones perpendicular to the cornea get admittance through it and the humors behind (fig. 1.3). The light rays should converge in the center of the eye A (fig. 1.4) but are refracted by the rear surface of the crystalline lens and funneled in proper order into the optic nerve (fig. 1.5). From Mark. A Smith, "What is the History of Medieval Optics Really About".

The idea of settling the matter by performing themselves some observations, maybe even some dissections, seems to have never come across the minds of the Perspectivists or, in case it ever occurred, it has left virtually no evidence behind (the disciplinary divide between scholars interested in a mathematical science such as optics and anatomy practitioners was indeed quite marked at the time).[25] Actually, after having admitted that the anatomists have much more to say about the inner structure of the eye, Pecham abruptly ended the discussion claiming that minutiae of this sort are "not the concern of physics [i.e. optics], which considers only what pertains to eccentricity or concentricity, refraction, and reflection" of the rays.[26] This firm claim can be taken to define the general attitude toward anatomy of these writers in optics: the model of the eye they defend is indeed constructed rather than observed. Even by admitting that, up to a certain extent, any observation is necessarily theory-laden, the Perspectivist account conflicts so badly with empirical data to have to be better approached as an almost purely *theoretical construct in service of an epistemology*, as the highly idealized diagrams illustrating their works suffice to attest.

[25] Although Bacon invites at one point his reader to take the eye "of a cow, pig, or other animal if anyone want to have the experience (*si quis vult experiri*)" that the model of the eye he is proposing is accurate; *Perspectiva* I 3, 3; Lindberg 45.

[26] Pecham I 31 {34}; Lindberg 117.



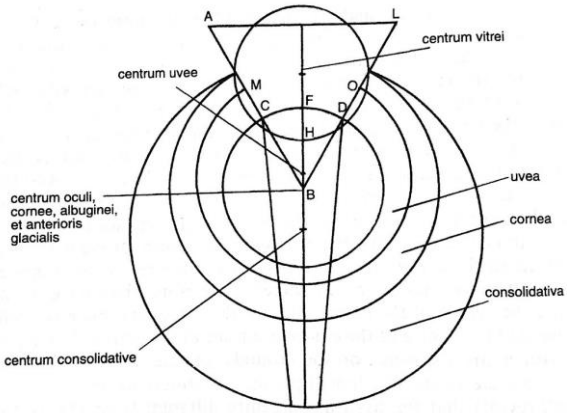


Fig. 2: The *figuratio antiquorum* of the eye, as discussed by Bacon in his *Perspectiva* (ed. Lindberg 47).
Fig. 3: Bacon's scheme of the eye in his *Perspectiva* (ed. Lindberg 43).

Such an appeal to perpendicularity and refraction to filter out a proper image of the external body is indeed eminently optical in nature, but the motivations for arguing along these lines lie elsewhere. This might be proved by simply considering stage (ii) of the *species* transmission, from the crystal lens to the brain. The focusing of light rays till the entrance of the nerve's foramen can in fact still be accounted for in optical terms, by appealing to the shape of rear surface of the crystalline humor and its difference in refractive index with the vitreous one, situated immediately behind. As soon as the *species* enters the nerve, though, all optical principles must be abandoned, for the obvious reason that optic nerves could maybe supposed to be hollow, but are definitely not straight. Unfortunately, all the story up to that point – up to the foramen of the optic nerve, namely – was based on the principle that light rays travel rectilinearly (as admitted by everybody).

Forced to decide between his optical principles and his epistemological commitments, Pecham, like all the Perspectivists before him, seemed yet to have no doubt:

> On the contrary, when the species has reached the vitreous humor... it proceeds more according to the law of spirits than according to the law of transparency. It is indeed curved, following the path of the spirits, all the way to the optic chiasma.[27]

[27] Pecham I 40 {43}; Lindberg 125* (emphasis added): "Immo cum pervenit species ad humorem vitreum… secundum legem spitiruum magis procedit quam secundum legem dyaphoneitatis; incurvatur enim secundum viam spirituum usque ad nervum {communem}". Cf. Bacon, *Perspectiva* I 7, 11; Lindberg 97-99: "And in this we admire the power of the soul's excellence, whereby it compels a species to follow the twisting of the nerve, so that it proceeds along a twisting line, rather than a straight line as in inanimate bodies of the world. For as long as is in a single inanimate medium, it always proceeds along straight lines… but owing to the necessity and nobility of the works of the soul, a species in an animate medium follows the course of the medium and abandons the common

Despite contradicting each other, the principles of optics – concerning the linear propagation of light rays and their refraction (*lex dyaphoneitatis*) or, as Bacon calls them "the common laws of natural multiplications" – and this quite enigmatic "law of spirits" (*lex spirituum*) were in fact intended to reach the same conclusion: let the visual system accomplish his intended task by bringing to the seat of perception an unaltered likeness of the object. The contrast between these two laws was not to be understood, by the Perspectivists, as an antinomy between the "optical" and the "psychological" modality light comes to be propagated. Indeed, it is only within the modern understanding of the discipline (largely post-Keplerian, and in the main still ours) that it can make sense to address the issue in these terms. Optics, for Alhacen, Bacon, Witelo and Pecham and all the theorists in the field, was thematically concerned with the activity of seeing, and almost only instrumentally with the physical behavior of light rays, and it is in fact from vision (ὄψις) that the discipline took its name, by taking vision as its object of enquiry. In Mark Smith's elegant phrasing, during the Middle Ages optics was the science of sight, rather than of light specifically, as it happens to be the case from the Early Modern period onwards (some of the reasons behind this shift are discussed in the following chapter).[28] As a consequence, for the Perspectivists both the "law of transparency" and the "law of spirits" were *optical* in nature, since both had to be posited in order to account for the visual process. The contradiction between rectilinear and bent propagation of light rays was still in place, admittedly, and will cause much troubles to Early Modern thinkers. This all being said, it is crucial to realize that in the Middle Ages such a "contradiction" was understood to fall inside the purview of optics, rather than obtaining between the fundaments of this science and, say, psychology. More than as a science for its own sake, at the time *perspectiva* was indeed cultivated to corroborate an epistemology that had already been accepted on different grounds. Therefore, any contrast between the principles of this science and the broad philosophical framework was ruled out right from the outset. It was rather optic that had to accommodate, bending its principles if need be, as it needed to bend light rays to bring colors up to the brain. Optics was in fact understood at the time as a sort of *ancilla philosophiæ* or, with more justice to its merits, as that science in charge of providing flesh and blood to the abstract claims of the latter. Philosophy

laws of natural multiplications (*leges communes multiplicationum naturalium*)". Cf. *Alhacen's Theory of Perception*, ed. A. Mark Smith (Philadelphia: American Philosophical Society 2001), II 2, p. 422.

[28] A. Mark Smith, *From Sight to Light: The Passage from Ancient to Modern Optics* (Chicago - London: University of Chicago Press 2015). On the evolution of discipline from Antiquity to the Early Modern Age see also Philippe Hamou, *Voir et connaître à l'âge Classique* (Paris: Presses Universitaires de France 2002).

demanded a coloring of the brain; optics was there to provide it.

The Perspectivists had slightly different answers about how this was specifically to be achieved, especially as far as the anatomy of the eye was concerned, but the general scheme of explanation has never called into question by the scholars in the field well beyond the 13th century. The works of these authors set the standard for all later enquires into the topic, so that when in 1572 Friedrich Risner (a student of Ramus') prompted his tremendously influential edition of both Alhacen and Witelo, he could still entitle the work "the treasure of optics", as if nothing substantial had been added to the topic during the five centuries in between.[29] With quite of an understatement, Kepler will accordingly entitle his groundbreaking treatise in optics a "Supplement to Witelo", whose scientific merits were still celebrated by Descartes.[30] The scholars of the 16th and 17th century were not always following slavishly their masters, though. Starting from 1542, for example, the editions of the *Perspectiva communis* adapted Pecham's claims concerning the structure and function of the parts of the eye to have them consonant with the current views on the topic.[31] Georg Hartmann and all subsequent editors, however, did not feel compelled – or simply did not dare to – modify one word of Pecham's theses about the optic nerves and the coloring of the *ultimum sentiens*, as a simple look at the engravings suffices to prove. How the albugineous, the glacial and the vitreous humors were supposed to relate to each other could well have been brought up to date but, after more than five centuries, the Perspectivist Scheme still stood firmly on its Aristotelian foundations: visual perception (like all perceiving) was still understood to consist in the assimilation of a *species* conceived, accordingly, as *similitudo*.

In the very same year of Hartmann's edition, however, a way more remarkable book dealing with ocular anatomy was completed. Other books and other findings followed: within a few decades the Perspectivist Scheme, apparently so well-established, started to break down.

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[29] The complete title of Risner's edition reads *Opticæ thesaurus: Alhazeni Arabis libri septem, nuncprimum editi, eiusdem liber De Crepusculis & nubium ascensionibus* (Basel: Episcopios 1572).

[30] To Mersenne, 27 May 1638; AT III 141-42; K 103.

[31] Cf. David C. Lindberg ed., *John Pecham and the Science of Optics*, 57-58.

§22. Early Modern findings

Andreas Vesalius' *De humani corporis fabrica* (1543) has been regarded by many as the first modern treatise in anatomy. *The constitution of human body* – or, more literally, its "fabric" – has been credited such an outstanding position in the history of science, first and foremost because of Vesalius' rejection of Galen's authority in the name of self-performed dissections. In the light of these observations Vesalius felt forced to question, among many other received theories, a crucial point of the Perspectivist Scheme:

> I am unable to differentiate nerves by the cavity within them as I have never seen such a cavity or channel, even in the optic nerve… although the professors of dissections state that the optic nerve are the only ones that are hollow.[1]

As a matter of fact, while Galen maintained that *all* peripheral nerves are hollow, some other theorists in the field (possibly starting from the 9th century Arab thinker Hunain) argued that this was the case only for the optic ones.[2] Bacon, accordingly, could claim that, as far as the nerves were concerned, "to be 'optical' is indeed the same as "to be hollow "(*opticitas est idem quod concavitas*)" and gloss one term with the other: "optic – namely, hollow – nerves (*nervi optici, id est concavi*)".[3] As pointed out in the chapter before, the reason to make this exception was that according to the Perspectivists that light and color can only propagate in transparent media. Therefore, the channels bringing them to the brain could not be opaque: a condition very easy to meet for hollow nerve. By the same token, it was claimed that also "the sensitive body in the nerve's cavity" – the spirits, namely – "must therefore necessarily be transparent in order for the

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[1] Andreas Vesalius, *De humani corporis fabrica* (Basel: Oporinus 1543), IV 1, 317. *On the Fabric of the Human Body*, translated by W. F. Richardson – J. B. Carman (Francisco - Novato: Norman Publishing 1998-2009), III 165.

[2] Cf. Lindberg, *Theories of Vision*, 36-37.

[3] *Perspectiva* I, 4, 3; Lindberg 55*. *Ibid*.: "The nerve over which the eye is composed is entirely optical (*totaliter opticus*), as Alhacen says, so that a species can run through it to the brain". *Perspectiva* I, 2, 1; Lindberg 23*. *Perspectiva* I 1, 2; Lindberg 5: "the optic nerves – that is, the hollow nerves by which vision is produced (*nervi optici, id est concavi facientes visum*)". On the issue, see Edwin Clarke, "The doctrine of the Hollow Nerve in the 17th and 18th Centuries" in L. G. Stevenson – R. P. Multhauf eds., *Medicine, Science and Culture: Historical Essays in Honor of Owsei Temkin* (John Hopkins Press: Baltimore 1968), 123-41. The importance of this point has not escaped to the already in the past centuries, see Giovanni Battista Morgagni, *Epistola anatomica XVII* in Id., *Epistolæ anatomicæ duodeviginti* (Venezia: Francesco Pitteri 1740). Johann Gottfried Zinn, *Descriptio oculi humani iconibus illustrata* (Göttingen: A. Vandenhoeck 1755), 183-89 (*Historia nervorum oculi*).

visible forms to be apprehended".[4] The other sensible properties, on the other hand – for example hot and cold, as well as wet and dry (the primary proper objects of the sense of touch) – do not demand any like a condition to be transmitted. Therefore, the nerves carrying them to the brain did not need to be hollow, and observations ascertained that they were in fact not. Although it cannot be ruled out that ocular anatomists had been led astray by the central retinal artery and vein (which are indeed hollow) or some other nervous structures such as the meningeal covering, it seems quite likely that they their claims about the optic nerves had been prescribed in advance by their physiological theories concerning the role of the spirits and their epistemology of assimilation rather than being adopted because of some poorly performed dissections. (I dissected a few cow's eyes to better appreciate the matter and, frankly, the claim that the optic nerves are hollow looks outright untenable).

Galen, however, already pointed out the shortcomings of ocular dissection in disclosing the functioning and the very structure of the eye, since the animal spirits that "inflated" it and made it sensible were said to disperse as soon as the animal ceased to live. Accordingly, the optic nerves could have already collapsed, and their openings disappeared before the anatomist could snatch his scalpel. There is therefore no taste for the macabre in Vesalius' grim report of himself grabbing a head almost before it could touch the ground after the execution – "it was still warm", he scrupulously remarks – and keeping it in hot water while running to his laboratory hoping the animal spirits would have not flown off in the meantime. They did, apparently, or, at least, the optic foramen was no longer visible. Vesalius, who still believed that the spirits had a vital role to play in "the fabric of the human body", and not only in relation to vision, seems to have been quite puzzled by this result and limited himself to indicate the problem, without yet offering an alternative account of the visual process. He was an anatomist and a physician, at the end of the day, so that (lacking any better option) he should have felt legitimate "to leave to the natural philosophers to argue about" it, as Kepler will do more than half a century later.

The question about how a color *species* could be transmitted through the optic nerves once these were no longer hollow – and, hence, internally transparent – was indeed pressing, since this species could no longer "glowingly travel though the way of the spirits" (*radiose transit per vias spirituum*) that the Perspectivists had paved for it.[5] To make clear its moment it should suffice

[4] Witelo, *Opticæ thesaurus* III 22, 95: "Corpus subtile, quod est in concavitate nervi inter humorem vitreum & nervum communem, quod corpus nominatur spiritus visibilis… Corpus itaque sentiens, quod est in concavo nervi, erit necessariò diaphanum propter receptionem formarum visibilium".

[5] Pecham, *De anima quæsitum est utrum recipiat in se species corporales ab extra*, Questiones *Excerptae ex Quodlibet Florentino* III in Pecham, *Tractatus de Anima* ed. Gaundentius Melani (Firenze: Bibliotheca di Studi Francescani 1948), 147.

to say that Kepler found it way more challenging than the inversion of the retinal image he himself had discovered, and which represents another crucial finding – arguably *the* most important finding – of Early Modern vision theory.

Not that the inversion of the retinal image went without troubles. The Perspectivists had indeed explicitly argued, again and again, that the seat of vision could not be placed behind the crystalline lens – or, more to the point, in the rear hemisphere of the eye – since otherwise the *species* would have been inverted, so that we would perceive *eine umgekehrte Welt*, "as the Antipodes do".[6] The urgency of keeping the visual *species* upright was voiced by every writer in optics for centuries. Even after natural philosophers started experimenting with the *camera obscura* to enquire into the functioning of the eye, they still refuted to admit for the eye the same kind of image inversion they were confronted with in the *camera*.[7]

Ad hoc solutions of all kinds were proposed (Leonardo da Vinci's are especially remarkable under this regard), and many more would have been advanced after Kepler made public his discovery in his 1604 *Ad Vitellionem Paralipomena*.[8] Some, like the Jesuit Christoph Scheiner (one of the leading scientists of his time, who made the observation of the parhelia that prompted Descartes to write *The World*) argued that the light rays arrived inverted to the eye, so that the inversion of the inversion would have cause the world to appear in proper order on the retina.[9]

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[6] Giovanni Battista Della Porta, *Magia Naturalis* (Naples 1589), XVII 6, 266. See also J. Brengger to Kepler, *date*, in Kepler, *Gesammelte Werke* 15: 90-9. On Kepler's criticism of Della Porta's account of the image formation as presented in the *Magia naturalis* and, more in general, on his theory of the optical images, see Sven Dupré, "Inside the *Camera Obscura*: Kepler's Experiment and Theory of Optical Imagery", *Early Medicine and Science* 13/3 (2008): 219-44. The entire number of the review – thematically devoted to the problem of "optical imagery" in Kepler and related thinkers – is worth reading. See Alan E. Shapiro, "Images: Real and Virtual, Projected and Perceived, from Kepler to Dechales", *Ibid.* 270-312 as well as Isabelle Pantin's essay mentioned below. For a very recent and insightful analysis of Kepler's *Paralipomena*, see Raz Chen-Morris, *Measuring Shadows: Kepler's Optics of Invisibility* (University Park: Penn State University Press 2016).

[7] On the fundamental role of optical instrument for the philosophy of the time, see Philippe Hamou, *La Mutation du visible: Essai sur la portée épistémologique des instruments d'optique au XVIIe siècle.* volume 1: *Du* Sidereus Nuncius *de Galilée à la* Dioptrique *cartésienne* (Villeneuve d'Ascq: Presses Universitaires du Septentrion 1999).

[8] For Leonardo's attempts to deal with the problem see Smith, *From Sight to Light* 307-308.

[9] Scheiner's solutions is discussed in Ofer Gal – Raz Chen-Morris, *Baroque Science* (Chicago - London: University of Chicago Press 2013), 32-34. On his attempt to reintegrating the Scholastic species into a Keplerian framework, see Isabelle Pantin, "*Simulachrum*, *Species*, *Forma*, *Imago*: What Was Transported by Light into the *Camera Obscura*? Divergent Conceptions of Realism Revealed by Lexical Ambiguities at the Beginning of the Seventeenth Century", *Early Science and Medicine* 13/3 (2008): 245-69. For Descartes' dependence on Scheiner's astronomical observations, see To Mersenne, 3 May 1632; AT I 245. To Mersenne, 10 May 1632; AT I 250. *Principia* III 35; VIII-1 95, 1-4 (on

Others, like Gassendi, perhaps even more fancifully, speculated that the retina acted like a mirror by projecting the inverted image on the rear surface of the crystalline lens, which he assumed to be the sensible part of the eye in keeping with the traditional Perspectivist teachings.[10] In this case too, the supposed double inversion was intended to restore the proper orientation of the *species*, letting the world manifest itself as it actually is: the flame of the candle pointing upward to the sky rather than earthward, to the throat of the observer. Kepler himself was initially all but happy about the inversion of the retinal image but ended up surrendering to evidence and the power of reasoning.[11]

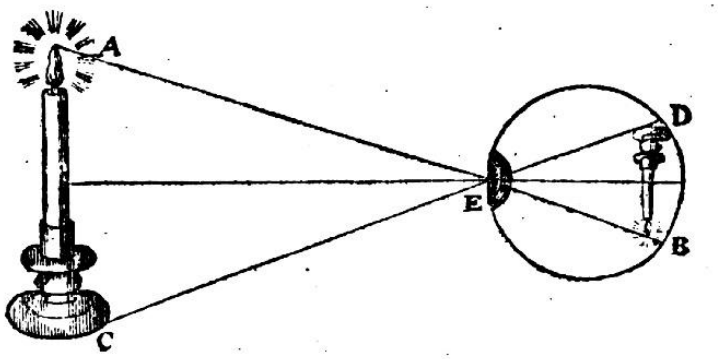

Fig. 4: Henricus Regius, *Fundamenta physices* (Amsterdam: Louis Elsevier 1646), 272.

Sunspots). As Descartes points out, "Galilée & de Scheiner… après Kepler sont les plus célèbres en cette matière" – optics, namely; cf. To Huygens, 5 December 1635; AT I 593.

[10] See Robert A. Hatch, "Coherence, Correspondence, and Choice: Gassendi and Boulliau on Light and Vision" in *Actes du Colloque International Pierre Gassendi* (Digne-les-Bains: Société Scientifique & Littéraire des Alpes de Haute-Provence 1994), 365-85.

[11] Cf. Kepler, *Ad Vitellionem Paralipomena* 205-206; Donahue 221.

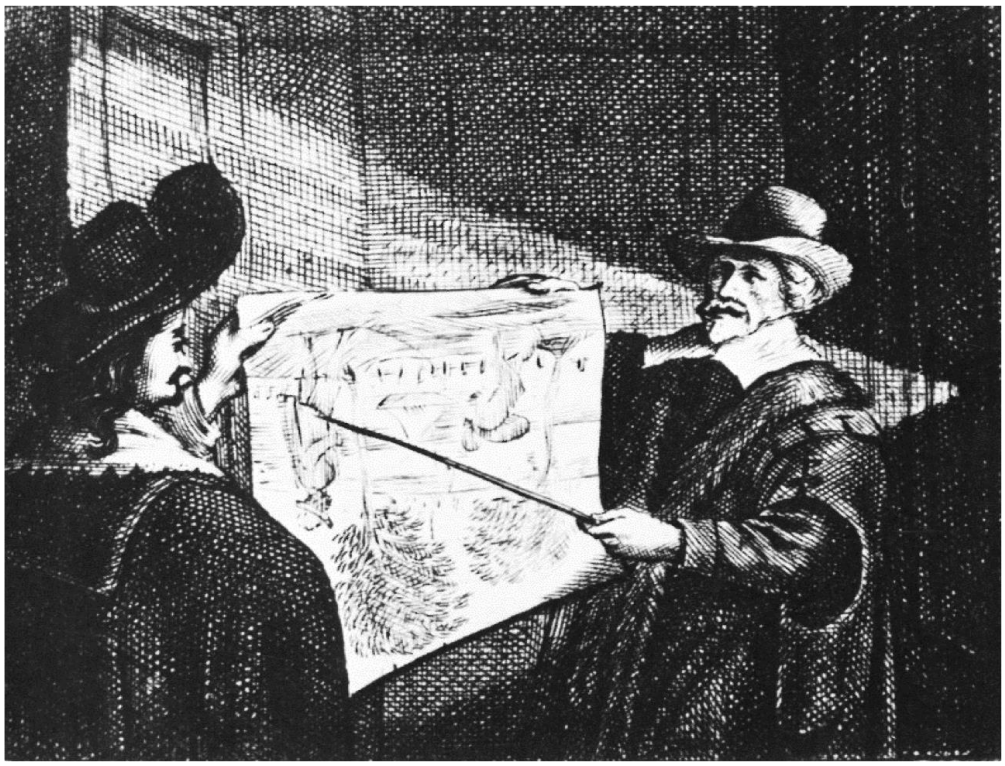

Fig. 5: Johan van Beverwyck, *Schat der Ongensontheyt* (Amsterdam 1664), II 87; reproduced in Svetlana Alpers, *The Art of Describing: Dutch Art in the Seventeenth Century* (Chicago - London: University of Chicago Press 1983), 42.

The reason why none of these thinkers were ready to accept the inversion of the *species* is, of course, the very same that forced them to construe as concentric all the anterior surfaces of the eye and the optic nerves hollow inside: the idea that the *species* in the eye had to be similar to the object if it has to make it known. Similar in both color and orientation. As shown by Dupré, even after Kepler's discovery late Scholastics tried indeed to rescue at least part of the received *species* doctrine, given its crucial role in their overall epistemology.[12]

Kepler, however, did not think that the inversion of the retinal images was so "mighty" a difficulty as Berkeley would still maintain more than one century later.[13] He argued, actually, that there were sound *a priori* reasons (besides the purely physical-mathematical ones) for the image in the eye to be inverted. Indeed, since acting and being acted upon are metaphysically opposite, and since the object was acting on the perceiver, Kepler concluded that the perceiver could not but receive an inverted image of the perceived object. Unsurprisingly enough, the argument did not take hold. Kepler advanced also a different solution to the inversion problem, which is on the other hand more convincing and already seems to foreshadow Berkeley's strategy in dealing

[12] Sven Dupré, "The Return of the *Species*: Jesuit Responses to Kepler's New Theory of Images" in Wietse De Boer – Christine Göttler eds., *Religion and the Senses in Early Modern Europe* (Leiden: Brill 2012): 473-87.

[13] George Berkeley, *An Essay towards a New Theory of Vision* §88.

with this difficulty.[14] It was not a straightforward solution, admittedly, and Kepler would have never complained had the image in the eye kept a proper orientation. It was not the case, unfortunately, yet Kepler still believed this problem could be satisfactorily answered.

Inverted or not, in fact, what mostly bothered Kepler, and almost brought him to despair, was how this light image could be transmitted "through the opacities of the body up to the inner cell of the soul". For Kepler, the problem of having the body – the nerves – "opaque" could not be surmounted because, as he regretfully admitted, the laws governing light-ray refraction could no longer apply once light had been brought to a halt:

> I say that vision occurs when an image of the whole hemisphere of the world that is before the eye, and a little more, is set up at the white wall, tinged with red, of the concave surface of the retina. How this image or picture (*idolum seu pictura*) is joined together with the visual spirits that reside in the retina and in the nerve, and whether it is arraigned within by the spirits into the caverns of the cerebrum to the tribunal of the soul or of the visual faculty; whether the visual faculty itself, like a magistrate given by the soul, descending from the headquarters of the cerebrum outside to the visual nerve itself and the retina, as to lower courts, might go forth to meet this image – this, I say, I leave to the natural philosophers (*Physicis*) to argue about. For the arsenal of the optical writers does not extend beyond the first opaque wall of the eye (*nam Opticorum armatura non procedit longiùs, quàm ad hunc usque opacum parietem, qui prius quidem in oculo occurrit*). I do not think that Witelo should be heeded in regard to Book 3 Prop. 20, in thinking that this image of light originates further through the nerve, as far as where the nerves of the two eyes, in mid-course, come together in a kind of joint, and again diverge into their individual cavities of the cerebrum. For what can be pronounced by optical laws (*legibus Opticis*) about this hidden confluence, which, since it goes thought opaque, and therefore dark, parts, and is administered by spirits – which differ entirely in kind from humors and other transparent objects – has already completely removed itself from optical laws… If anything is to be said about this conjoining of the nerves in mid-course, it should be according to physical principles (*rationibus physicis*) [as opposed to optical ones]. For it is more certain than certain that no optical image carries through this far.[15]

Although Kepler was ready to admit that, in principle, given the actual meaning of the word, a writer in οπτική ought to provide a comprehensive account of the entire visual process, he did not dare to break with the entire tradition and divorce optics from light. *Nothing but darkness lies beyond* the retina, though. The science of the Perspectivists, whose investigations into the nature

[14] Cf. Kepler, *Ad Vitellionem Paralipomena* 206; Donahue 221: "nor is there any fear that the sense of vision might err about the location [of the object seen]. For when it perceives an elevated object it clearly turns the eyes upwards, acknowledging them to be low in position and opposite the object, with respect to place".

[15] *Ibid.* 168-69; Donahue 180*.

and behavior of light were chiefly subordinate to the study of vision, turned thereby into the science of light in its own right. Kepler, to cast the point in Pecham's terms, could thus no longer speak of a "law of spirits" and had to content himself only with the "law of transparency". Accordingly, he departed resolutely from received knowledge protesting that "spirits are not an optical body" (*corpus opticum*). For Kepler, the *lex spirituum* of the Perspectivists becomes therefore a topic for physicists – for "natural philosophers", as he put it. Disciplinary boundaries aside, what counts is that Kepler no longer felt entitled to speak of a proper tinging of the spirits, and demoted this well-established thesis to mere analogical talk. In Kepler's view, indeed, is not by virtue of their transparency that the spirits are impressed by light and colors, but by a physical *impression*, where the light and the colors as we know them seem to have disappeared altogether:

> Optically speaking it can only be said that spirits are acted upon by colors and light and this passion is, so to speak, *a sort of* coloring and of illumination (*quandam, ut ita dicam, colorationem & illustrationem*) … Vision occurs through an impression of the *species* upon the spirits. The impression itself is not optical, though, but physical and astonishing (*impressio vero ipsa non est optica, sed physica & admirabilis*).[16]

More than the proud declaration that a new discipline, autonomous from any epistemological consideration, was finally born – a brand new "science of light" no longer concerned with vision as a whole – Kepler's statements sound like a resigned capitulation, and he does expressly lament over "the poverty of our science" on this specific issue.[17] The main reason why the *lex spirituum* had to be thrown out from Kepler's new optics was not it being partly psychological and quite at odds with the standard law of refraction. It was rather that Kepler had realized that the spirits could not transport any light and color "through the opacities of the body". It was not so much optics to have limited itself to light, in Kepler, as it was light to have stopped at the retina.

Kepler continued to be baffled by the transmission of the retinal image to the brain until

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[16] *Ibid.* 169-70; Donahue 181* (emphasis added). In the *Dioptrice* Kepler states that the "pictura seu illustratio, est passio aliqua, non tantum superficiaria… sed etiam qualitativa penetrans in spiritus"; cf. *Dioptrice* prop. LXI, 23. In both passages Kepler mentions afterimages as a piece of evidence for this claim. Descartes, will discuss the same phenomenon in the *Dioptrique* (AT VI 131, 7 - 132, 3) as a case for his theory about the nerves; cf. §24.1.

[17] Kepler, *Ad Vitellionem Paralipomena* 169; Donahue 180: "Nevertheless, though this nerve, vision, from which the word "optics" is derived, occurs; and it is therefore wrongfully cast put of optics, because, owing to the poverty of our science, it cannot be tolerated in optics". This is one of the few points where I think the narrative of Mark Smith's 2015 book should be adjusted.

the end of his life. Striving to get rid of the difficulties encountered some years before, in the 1611 *Dioptrice* he went so far as to question the role of nerves in perception and to consider the hypothesis of some even subtler spirits, spread throughout the entire body, somehow able to transmit the retinal image to the brain.[18] Clearly dissatisfied with this solution too, he promptly ventured to conjecture that the continuous presence of spirits in the optical nerves was maybe enough, by itself, to explain the transmission of the *species*, which could be transmitted from the eye to the brain as the waves resulting from casting a stone in still water are transmitted to the banks. Arguing along these lines Kepler almost ended up falling back in the Perspectivist Scheme, though, speculating that, "as the Sun illuminates everything by pellucid straight lines, so the faculty of the soul which is in the brain illuminates the sense organs by *spiritual* lines through any bending, provided these lines are continuous" – *viz.* provided they do not get broken because of the tortuous twists of the optical nerves.[19]

This piece of theory relies of course on admitting that the optic nerves have a foramen, through which spirits propagates. The claim should come as no surprise even after the 1543 publication of the *De humani corporis fabrica*: as shown, Vesalius himself still believed that these spirits – despite the fact no one had ever seen them – were instrumental in physiological process. All the more in perceptual ones, as Kepler too maintained.[20] The crucial point suggested by Vesalius' discovery, and fully embraced by Kepler, is indeed that such an undetectable foramen, maybe still to be postulated in order to bring vivifying spirits to the eye, still could not account for the transmission of light to the brain. As Kepler expressly points out, the optical nerves do not transmit the *species* inasmuch as they are hollow, so to let light creep through them, but only inasmuch as they are completely *full* of a body, so to enable a continuous transmission of a physical impression. In Kepler, spirits do not propagate the retinal image because they are

[18] Kepler, *Dioptrice* (Augsburg: Franci 1611), prop. LXI, 24; GW IV 373. "Cum igitur manifestum usum habeant nervi optici; obscurum est, an etiam insuper serviant speciei affecti instrumenti traducendæ intrò in cerebrum: an potius sint alii aliqui spiritus, subtiliores corporeo isto, per retiformem sparso, qui meatu corporeo non indigentes, per totum corpus libere spacientur, membrorumque, affections excipientes, cerebri facultati, quæ communis sensus dicitur, communicent".

[19] Cf. *Ibid.*: "Potest dici quemadmodum Sol lineis rectis pellucidis illuminat omnia; sic Animæ facultatem, quæ est in cerebro, lineis *spiritualibus* quocumque flexu, tantummodo continuis, illuminare instrumenta" (emphasis added).

[20] In the same proposition of the *Dioptrice* Kepler argues that the manifest use of nerves is exactly to vivify the eyes but supplying them with sprits. Accordingly, he defines vision as the "sensio affectæ retiformis spiritu visivo plenæ, sive, Visio est sentire affectam retiformem, quatenus affectam". Kepler contended that the optic nerves have a foramen already in the *Paralipomena*.

transparent, but only because they are fluid (and, as such, fill up the nerve's foramen).[21] Hollow or not, what only mattered for Kepler was that optic nerves could no longer said to the light-conductive. They were, indeed, opaque.

Albeit ingenious, the solutions worked out in the *Dioptrice* were hardly persuasive. Kepler himself ended up dropping all of them. As pointed out by Simon, in the *Harmonices mundi* (published fifteen years after the *Paralipomena*), Kepler grudgingly admitted he still had no clues as how the transmission of the retinal image could be accomplished or, even more basically, whether it was this image to be transmitted to the brain or rather the soul to "descend":

> For although the most careful opticians and medical anatomists confess that… I have at least firmly demonstrated the way of seeing after so many fruitless attempts by others… yet that way of seeing does not extend beyond the retina – i.e. beyond the point the fluids of the eye are transparent (*ille videndi modus non ultra retiformem tunicam sese porrigit, quâ perspicui sunt humores oculi*). There still remains the question, not yet settled by the natural philosophers to whom I have appealed, how the picture of the thing which is to be seen, formed according to me on the retina, is from there on received through the opacity of the body up to the inner cell of the soul. Or does the soul proceed outwards to meet it? And what hangs on that? To speak frankly, I am more puzzled by the visual process than by the Soul of the Earth perceiving the angles of the rays. About the latter, I think I am capable of some by no means inept babbling, whereas on the former I am completely dumb.[22]

For Kepler, in the end, astrology turned out to be on firmer grounds than vision theory.

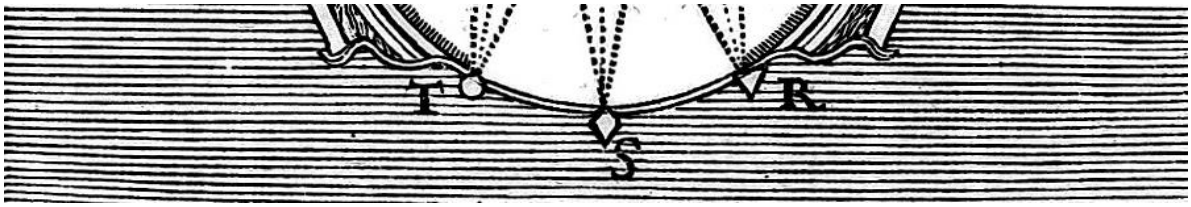

Fig. 6: Kepler's "first opaque wall of the eye" where optics comes to an end, as represented in Descartes, *Dioptrique* (AT VI 116), detail.

[21] Cf. *Dioptrice*, prop. LXI, 24: "Forte sic est, ut tranferatur hæc species affecti instrumenti à retiformi in cerebrum per meatum quidem nervi Optici, non tamen quatenus is est aliquis corporeus meatus, sed quatenus is ab ipsa sede sensus communis usque ad nervum opticum est spiritus plenus, & sic continuatio spiritus sit causa transeuntis affectionis ab oculo in cerebrum: sicut in stagnantibus undis motus lapillo iniecto factus, ad littora usque propagator: quousque scilicet superfies aquæ stagnantis continuatus".

[22] Kepler, *Harmonices Mundi* IV 7; GW VI 274; *The Harmony of the World*, translated with introduction and notes by Eric J. Aiton – Alistair M. Duncan – Judith V. Field (Philadelphia; PA: American Philosophical Society 1997), 370*. On Kepler's difficulties (and Descartes' proposals to dealing with them) see Gérard Simon, "La théorie cartésienne de la vision, réponse à Kepler & rupture avec la problematique médiévale" in Joël Biard – Roshdi Rashed eds., *Descartes et le Moyen Âge* (Paris: Vrin 1998), 107-18.

§23. Late Scholastic theories of perception

The problem put forth by Vesalius and brought to the fore by Kepler haunted the theorists of vision working in the first decades of the 17th century and, more in general, anyone interested in the philosophy of perception. Descartes made arguably the first systematic attempt to deal with the issue by following it up to its most far-reaching implications rather than forcibly adapt it to an already existing scheme (the way both Scheiner and Gassendi did, as far as the related problem of the image inversion was concerned). Although Descartes' solution was genuinely innovative, the conceptual apparatus he appealed to was not always of his own making. Some of the categories he used, as well as most of the solutions he opposed, came in fact from the Late Scholastic philosophy in which he had been trained.

In order to appreciate Descartes' solution to Kepler's dilemma (to be canvassed in the following section) one must therefore consider the Scholastic philosophical milieu between the 16th and the 17th century. The leading thread in this survey is provided by the commentary to Aristotle's *De anima* of the Jesuit Antonio Rubio (1548-1615).[1] The first reason for picking this quite remote commentary from the dozens written at the time, is Rubio's attention for the new trends in Scholastic philosophy – better exemplified by Francisco Suárez and Francisco de Toledo (also known as Toletus) and, at least to a certain extent, by Eustachius a Sancto Paulo – together with his acumen in confronting them with the received and more traditional conceptions. Besides these intrinsic merits, there are good reasons to believe that Descartes studied precisely this text while in La Flèche, where he stayed from Easter 1607 to September 1615. Descartes himself reports to have studied in his school days the Jesuit commentaries of the Coimbrans, of Toletus and, finally, Rubio's. Unfortunately, he does not state which texts specifically.[2] The *ratio studiorum*, however, established that Aristotle's *De anima* was to be examined during the final year of the conclusive three-year philosophical cycle.[3] At the time Descartes had to go through Aristotle's psychology, Rubio's commentary (published in Lyon in 1613) was therefore the most up-to-date text available and Descartes' teachers were without a

[1] Cf. Helen Hattab, "Rubius, Antonius" in *Cambridge Descartes Lexicon* ed. Lawrence Nolan (Cambridge & New York: Cambridge University Press 2016). On Late Scholastics accounts of sense-perception see more in general Alison Simmons, *Making Sense: The Problem of Phenomenal Qualities in Late Scholastic Aristotelianism and Descartes* (Dissertation in Philosophy at the University of Pennsylvania, Philadelphia). Id., "Explaining Sense Perception: A Scholastic Challenge", *Philosophical Studies* 73 (1994): 257-75.

[2] To Mersenne, 30 September 1640; AT III 185.

[3] Desmond M. Clarke, *Descartes: A Biography* (Cambridge: Cambridge University Press 2006), 15-33.

doubt keen to get themselves and their students a copy. It is therefore quite likely that Descartes first approached the *species* theory precisely though Rubio's commentary. Furthermore, I think I can provide a direct piece of evidence that Descartes was conversant with Rubio's commentary: Descartes' theory that the physiological stimuli are "established by nature" (*institués de la nature*) as to make a subject have certain sensations was indeed arguably advanced in response to Rubio's claim that any *species in organo* is "naturally designed" (*naturaliter ordinata*) as to let the perceiver assimilate the object's nature.

Rubio's commentary is also noteworthy for its attention to the recent developments of the anatomical sciences. As far as vision is concerned, for example, while expounding the Aristotelian theory of visual perception Rubio explicitly counters the Perspectivist theory with Vesalius' findings. He does not refer to Kepler by name, although by itself this does not prove much. Even his fellow Jesuit François d'Aguilon, who in the same year of Rubio's commentary devoted to the topic one of the most important treatise of the time, the *Opticorum Libri Sex* (Antwerp 1613), had in fact never mentioned Kepler, despite being arguably acquainted with the *Paralipomena*.[4] Rubio, at any rate, could well have realized by himself that the new discoveries in ocular physiology were at variance with quite a few points of the Perspectivists account. His main if not only concern in pointing out this inconsistency is nonetheless over a relatively minor issue, namely, the precise location of the visual sensory power (*potentia visiva*), whether this was to be located within the eye, somewhere in the optic nerves – as Toletus maintained – or, more specifically and more traditionally, in the optic chiasma.[5]

The observation that the optic nerves are not hollow brought in fact with itself the discovery that their foramina do not cross, undermining one more mainstay of the Perspectivists' account. As a matter of fact, the two optic nerves approach and their fibers partially cross to then distance themselves again in their way from the eyes to the brain. The Perspectivists, following again Galen, held nonetheless the much problematic claim that their foramina crisscrossed in a point they named "common nerve" (*nervus communis*) and the Greeks "chiasma", after the shape of the letter χ (*chi*). The rationale for assuming such an intersection was the conviction that the *species* from the left and from the right eye had to merge if the

[4] As argued by Pantin, "*Simulachrum*, *Species*, *Forma*, *Imago*". It is Kepler himself to point out that he is never mentioned in the *Opticorum Libri Sex*; cf. Kepler, *Harmonices Mundi* IV 7; GW VI 274 (the omitted lines of the passage quoted above). On the *Opticorum libri sex* see at least Sven Dupré, "Aguilón, Vitruvianism and his *Opticorum libri sex*" in Piet Lombaerde ed., *Innovation and Experience in Early Baroque in the Southern Netherlands: The Case of the Jesuit Church in Antwerp* (Turnhout: Brepols 2008), 53-66.

[5] Rubio, *Commentarii* 296-99.

perceiver was to experience *one* object, as is normally the case. The phenomenon of double-vision was in fact explained by an abnormal alteration in the "geometry" of the visual system, such as in the case of eye displacement, which caused the two *species* to remain at least partially distinct rather than coming together as one (in the case of drunkenness physicians blamed the spirits coming from outside for altering the functional state of the ones already in).[6] Vesalius' discovery, therefore, seemed not only to rule out a proper transmission of the object's *color* from the eye to the seat of perception located in the brain, but casts doubts on how an object could possibly be perceived as *one* object at all.

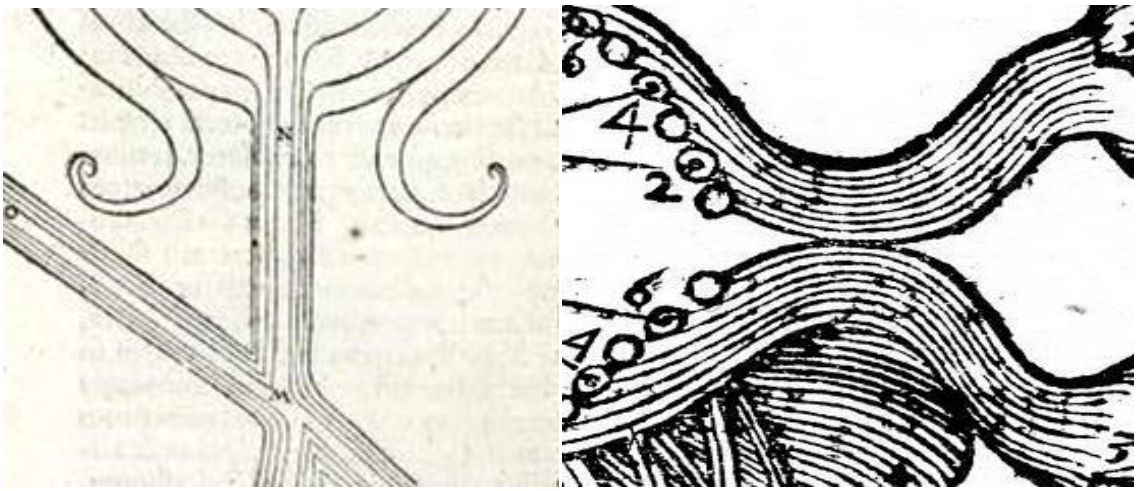

Fig. 7: Pecham, *Perspectiva communis* ed. Georg Hartmann (Nuremberg 1542), 31 (detail).
Please notice the mediocre attempt to avoid the problem of a non-rectilinear light transmission thought the optic nerves by depicting them as straight.
Fig. 8: Descartes, *Traité de l'Homme*; AT X 187; figure 36 (detail).

Rubio, who appeals to Vesalius to argue that the visual power resides in the eye (and, more specifically, in the crystalline lens), contents nevertheless himself to remark that is better to have two eyes than one alone, especially because, in case one of the two is injured, there is still one left to use. This insightful observation, unfortunately, does not provide any answer to the problem. As a matter of fact, Rubio's very approach to the topic is not particularly illuminating, since the Perspectivists were already unanimous in arguing that the crystalline lens too is sensitive. Actually, they went as far as to style it "the seat of the visual power". What the Perspectivists meant by that is that is only on this part of the eye – transparent and yet dense

[6] More in general, most cases of misperceptions and hallucinations occurring while ill were explained along similar lines; cf. Stuart Clarke, *Vanities of the Eye: Vision in Early Modern European Culture* (Oxford: Oxford University Press 2007), 39-77.

enough – that the *species* could properly "impinge", rather than limiting themselves to travel through as it is the case in the case of the cornea and the albugineous humor. As a matter of fact, this impinging upon and actual tinging of the crystalline lens amounted in their view to the first stage of the visual process. The reason why the Perspectivists posited the merging together of the two *species* in the optic chiasma as an additional stage of the process was indeed to account for the unified phenomenal character of binocular vision. Individually taken, however, the color *species* from the left and the right eye do not undergo any processing in the chiasma (their tinging the crystalline lens could hardly be defined a processing *of the species* itself; it was rather a qualitative change *in* and *of the eye*). Indeed, had just one eye been perceiving, the passage through the junction of the optics nerves of the single *species* would have had no consequences at all in the way the colors array of the world would have presented itself to the perceiver. According to the Perspectivists, as a consequence, this post-retinal stage of the visual process did not result in any actual change in the phenomenal *content* of visual experience, as compared with the former, but was only intended to eliminate the inappropriate doubling of the very same *species* (which would have resulted in a deceiving double appearance) introduced by the binocular apparatus. If the Perspectivists, as it happens to be the case, were sometimes ambiguous about whether the visual power was to be properly located at the crystalline lens or in the optic chiasma, this depends on whether they wanted to emphasize the capacity of the visual system to perceive a *color* or its ability to perceive *one* color (one for both eyes). It goes without saying that the same author, in one and the same work, could be interested in stressing the former point on one occasion and the latter in another one, without yet contradicting himself. The chiasma being the *ultimum sentiens* did not rule out, in fact, that the eye – and, more specifically, the crystalline lens – was sensitive as well.

Even more relevantly, the Perspectivists did not conceive of the perceptual process as articulated into a merely physiological opening stage (taking place in the eye) followed by a purely mental one, as it will be in Descartes. Indeed, within a consequent hylomorphic framework no like distinction can be drawn. The eye, consequently, and even the crystalline *lens*, despite the name, were not understood as mere optical devices, as it will happen from the very end 16th century onward. The first promoters of the lens model – Jacopo Zabarella and Girolamo Fabrizio d'Acquapendente – were Aristotelians (and, in the case of Zabarella, a very strict one), but it was mainly thanks to a few fierce opponents of this philosophical tradition, like Kepler and, later on, Descartes, that the model eventually held sway.[7] Aristotelians too would

[7] Cf. Tawrin Baker, *Color, Cosmos, Oculus: Vision, Color, and the Eye in Jacopo Zabarella and Hieronymus Fabricius ab Aquapendente* (unpublished Ph.D. thesis, Indiana University 2014).

have maintained that properly speaking it is the sensory soul to perceive, rather than the eye as such. Yet, in their view it is nothing but the sensory soul to "inform" the eye, that is to say, to turn a bulk of undifferentiated matter into a functional sensory organ. If an eye is an eye, it is thus only by virtue of the soul. There is therefore a very strong sense in which the sensory soul can be said to reside in the eye – and sensation, accordingly, to take place therein – rather than being entrenched within the brain as is the case for Descartes' *mens*.[8] Galenic physiology, moreover, supported the Aristotelian view. It pushed it even further, actually, speaking as if every organ had its own form.

The Perspectivists, therefore, would have completely agreed with Rubio's claim that the crystalline lens is "informed by the soul, which endowed it with sensory life (*vita sensitiva*) and makes it the organ of the sensory power".[9] The point at stake in bringing up the optic chiasm was yet quite another: the phenomenal unity of binocular vision. Rubio, besides criticizing (albeit with good reasons) the specifics of the Perspectivists' solution had in fact nothing to offer as a replacement. The question, as a matter of fact, does not appear to concern him that much. The problem was pressing, however, for anyone who aimed at going beyond the most abstract understanding of the perceptual process to flesh it out in more substantial terms. What Rubio, and many with him, seems to have failed to understand, is that quite often not only the Devil, but also the truth is in the details.

As a matter of fact, the demand to combine the two ocular stimuli into one will be Descartes' main reason for locating the seat of perception precisely in the pineal gland, which in his physiology takes over some of the functions of the optic chiasma. And not only of the optic chiasma. Indeed, Descartes maintained that also the sensory stimuli coming from the ears (they too being double) must undergo an analogous unifying process, and similarly the tactile stimuli in case the two hands are touching one and the same piece of matter. Even more strongly, the visual and the tactile impression caused by one object had for Descartes to merge in a single point of the gland, if the same object (a wooden arrow, say) is to be experienced as both rough and brownish:

[8] Even when Descartes tries his best to mitigate this thesis by claiming that there is still a sense in which the mind (the soul) is joined to the entire body, he is still adamant in maintaining that the mind "immediately" exercises its functions in the pineal gland alone, and only indirectly (via the nervous system and the spirits) in other limbs; cf. *Passions de l'Âme* I 30-31; AT XI 350-511.

[9] Rubio, *Commentarii* 299.

> The reason that convinces me that there cannot be any other place (*lieu*) in the whole body where the soul directly exercises its functions is that I notice that all the other parts of our brain are double, as also are all the organs of our external senses – eyes, hands, ears and so on. But in so far as we have only *one* simple thought about a given object at any one time, there must necessarily be some place where the two imagines (*images*) coming from the two eyes, or the two impressions (*impressions*) coming from a single object through the double organs of any sense, can come together in a single impression before reaching the soul, so that they do not present to it two objects instead of one.[10]

As Descartes explains in detail (while discussing the related question of *directing* different sense organs to *one* point in space):

> When the two eyes of this machine (and the organs of the several other senses) are directed toward one and the same object, there are formed not several ideas of it in the brain, but only one. To understand this, one must suppose that spirits leaving the same point on the surface of the gland H are able – by tending toward different tubes – to turn different members towards the same object. Thus, spirits leaving the same point *b* – by tending toward the points 4, 6, and 8 – simultaneously turn the two eyes and right arm toward object B. [11]

[10] *Passions de l'Âme* I 32; AT XI 352, 25 - 353, 11; CSM I 340* (emphasis added). See also To Meyssonnier, 29 January 1640; AT III 19-20. On the importance for Descartes of reunifying the double sensory stimuli in one organ, see Gert-Jan Lokhorst, "Descartes and the Pineal Gland" in *The Stanford Encyclopedia of Philosophy* (online).

[11] *Homme*; AT XI 182, 23-30; Hall 94.

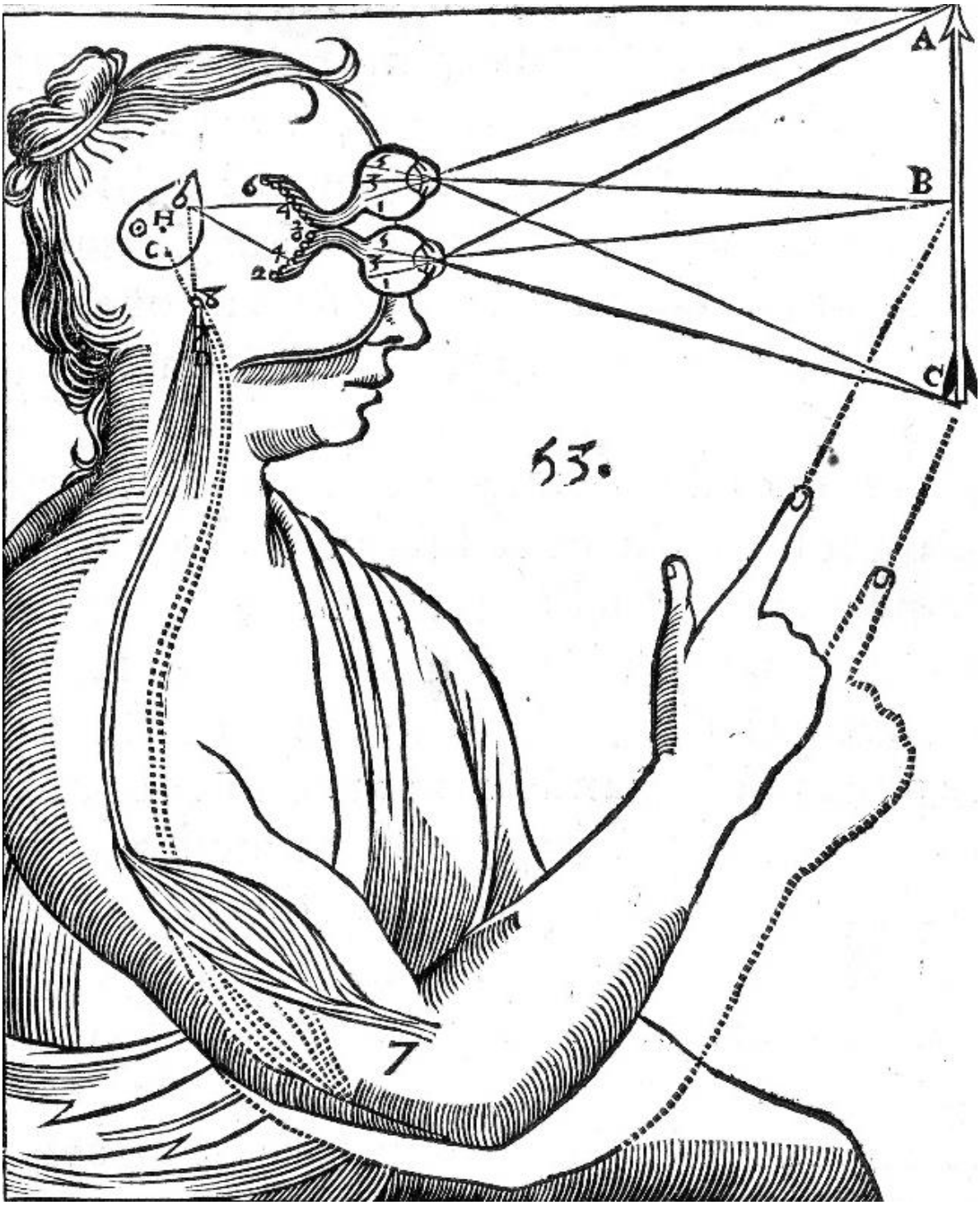

Fig. 9: Descartes, *Traité de l'Homme*; AT XI 181; figure 33.

There was nothing particularly unusual in these claims, however, notwithstanding Descartes' highly peculiar way of approaching the problem. Aristotle himself, indeed, in some quite obscure statements about the "common sense" and the "common sense organ" (presumably the heart) seemed to have argued that the impressions of white and sweet had to

somehow *physiologically* come together if the subject was to experience the same milk as both colored and savory.[12] For both Aristotle and Descartes it looks like the unity of experience – or, more precisely, the experience of one object according to multiple sensory modalities – does not demand anything like a transcendental synthesis of the manifold (as it will be in Kant) but, more modestly, an orderly fusion of these sensory stimuli in one (internal) sense organ.[13] The specifics of Descartes' solution go admittedly far beyond Aristotle's hasty remarks and his distinctive understanding of the physiological process in purely mechanical terms differs greatly from the hylomorphic approach to the same phenomenon worked out by the latter. This all being said, Descartes' often ridiculed theory of the pineal gland is in the end nothing but a highly sophisticated version of the "common nerve" of the Perspectivists, as well as of the common sense of the Aristotelians. Descartes does indeed expressly refer to the pineal gland as the seat of the *sensus communis*.[14]

Leaving aside his inability to explain how two eyes can bring about an undivided experience, the most interesting point of Rubio's commentary is to be found in his theory of *species* and, more specifically, in the claim that the *species* must not be taken as a sort of pictorial reproduction of the object. As Rubio notices, at the time he was writing it was in fact disputed whether the *species* is pictorially or only "virtually" similar to the object. Endowed with a quite accurate historical sense, Rubio points out that Aristotle – as well as the Perspectivists, one might add – appear to have embraced the former option, whereas most of his contemporaries (following Aquinas) contested the thesis of a coloring of the sense-organs. So does Rubio. Despite his reference to Vesalius in the very same *quæstio*, Rubio does not draw his arguments from

[12] See, for example, *De Anima* Γ 1, $425^{a}14$ - $425^{b}12$.

[13] It is true that, in the *Regulæ*, Descartes "passe entièrement sous silence le fonction synthétique du sens commun", as pointed out by Jean-Luc Marion, *Sur l'ontologie grise de Descartes* (Paris: Vrin 1993), 123. It would be unwarranted, however, to argue therefrom *e silentio* that Descartes was not concerned with the issue, maybe already at that stage of his philosophy. From at least the early 1630s the problem of a *physiological synthesis* is indeed the main concern of Descartes' theory of the common sense – *viz.* of the pineal gland. There have been attempts to find already in Aristotle something akin to Kant's syntheses (as especially defended in the A Deduction of the *Kritik*), but they are hardly convincing; cf. Dorothea Frede, "The Cognitive Role of *Phantasia* in Aristotle" in Martha C. Nussbaum and Amélie Oksenberg Rorty eds., *Essays on Aristotle's* De Anima (Oxford: Clarendon Press 1992), 279–95. On the crucial difference between Aristotle's and Kant's theories of the imagination (and, analogously, of the common sense), see Alfredo Ferrarin, "Kant's Productive Imagination and its Alleged Antecedents", *The Graduate Faculty Philosophical Journal* 18/1 (1995): 65-92.

[14] See, for example, *Dioptrique* V; AT VI 129, 19-22. According to the Bacon the optical chiasm and the common sense are strongly connected and do almost coincide. Almost, though; see *Perspectiva* I 5, 3; Lindberg 65-69.

physiology, however, and his intended conclusion is indeed much stronger than this empirical science could ever support.

What Rubio aimed at proving, in fact, is not only that the *species* do not need to be pictorially similar to the object (anatomy suggesting that this is the case), but that they *must be not*. Rubio's chief concern is that, in case the *species* were so, then this sensory-impression could be taken to be enough in order for perception to obtain, without any need to posit a further mental activity of any kind. The Perspectivists, who thought of the *species* as an actual pictorial reproduction of the object, literally tinging the brain, believed that this very concrete similarity was basically enough to solve the problem of sensory cognition. Within their overall philosophical theory, the thesis is indeed convincing. According to Rubio, however, what Aristotle and the Perspectivists regarded as a necessary condition of perception, threatens to debase it to a merely bodily and purely passive process. [15] Therefore, Rubio concludes, the sense-impression *must* be dissimilar to both the object and the corresponding sensation, since in this way alone the mind – in Rubio's talk, the (sensory) soul – can be granted a necessary role in the perceptual process. Rubio, in fact, expects that nothing but the mind can be able to process such an "opaque" sense-impression. As the passage quoted at the very outset of this section has shown, Rubio is indeed a wholehearted Aristotelian as far as the general theory of knowledge is concerned. Accordingly, he maintains that a sense-perception is true if and only if the subject apprehends the object as is, perceiving red when faced with a red object. Therefore, sense-*perception* must be similar to its ultimate cause, namely, the external object – or, more precisely, to a specific property (quality) of the object – whereas any similarity must fail in the case of the sense-organ *impression*, which works as an intermediate cause between the two. As a consequence, the difficulty in making clear how the *species* should – or, at least, does – exactly look like according to Rubio is non-casual and does not undermine his account: what only matters for him is indeed that the sense-impression is *not* pictorially similar of the object and, yet, elicits a sensation that must be formally so.

Obviously enough, Rubio's theory raises right away the question about how to make sure that the *species* issued from the object and impressing upon the sense-organs makes the subject perceive the object as it actually is. Rubio's solution is to argue that, although the *species* is not pictorially similar to the object, it is still similar to it "in a virtually way" and, accordingly, should be conceived as "something like a seed (*quasi semen*) of the object itself".[16] Rubio relies

[15] Rubio, *Commentarii* 220-21.

[16] *Ibid.* 220: "solum quadam ratione virtuali, quia virtus & quasi semen eiusdem objecti".

extensively on this metaphor: as a matter of fact, at one point he admits quite candidly that the seed-analogy is the only solution he could think of.[17]

Rubio's core claim is that, as a living being is engendered out of a seed which does not look like it – think of an oak and of an acorn – so the *species* that "fecundates" the sense-organ can breed a sensation that bears no (pictorial) resemblance to it.[18] As the acorn is "naturally designed" (*naturaliter ordinata*) as to generate an oak, so the *species* is argued to be "naturally designed" to bring about the pertinent sensation.[19] Rubio maintains in fact that the only way to account for the possibility of knowledge, once the Perspectivist Scheme grounded on pictorial similarity has been refuted, is to *assume* that the *species* impressed by the object on the sense organs somehow "encodes" in itself the form of the object right from the beginning.[20] Thereby, since the representative content of experience is determined by this impression on the sense organs, Rubio thinks it can be safely concluded that what the subject comes to apprehend is indeed a property that the object really possesses.[21] Rubio, therefore, concludes that, in case anything goes wrong, if the subject perceives red this is because he is confronted with a red object.

Rubio's theory, despite its shortcomings, remains thought-provoking and its core point stand even if the metaphysical reasons that dictated it at first are no longer adopted or taken for valid. A thinker like Descartes, for example, although sharing Rubio's aversion to any materialistic-minded account of perception, was hardly impressed by most of his *a priori* claims.

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[17] *Ibid.* 222: "non est enim alius modus excogitabilis".

[18] *Ibid.* 213: "potentiæ sensitivæ… quasi fœcundentur per speciem".

[19] *Ibid.* 222.

[20] This alternative metaphor is not Rubio's, but has been largely employed in the literature on the Scholastics (who speak, alternatively, of the representative content being "encapsulated" in the *species*).

[21] Rubio, *Commentarii* 222. For Rubio, the *species* is indeed the "effective principle of sensation" (*principium effectivum sensationis*). Rubio elucidates his point by mean of the quite traditional distinction between *species impressa* and *expressa*, arguing that, by means of the former, "objectum unitur potentiæ [sensitivæ], ut expressam, ac formalem sui similitudinem exprimat, quæ inhærens eidem potentiæ sit formalis eius notitia, seu cognitio; & sic per eam à potentia cognoscatur" (*ibid.*). Roughly speaking, in the case of sense-perception the *species impressa* corresponds thus to the object's *impression* on the sense organ *qua* physical alteration of these organs, the *species expressa* to the same impression insofar as it determines the *representative content* of the corresponding *sensation* (if not to the representative content of sensation tout court). For a short introduction to these concepts, see David Clemenson, *Descartes' Theory of Ideas* (London: Continuum 2007), 30-32. For the sake of the exposition, in what follows no like terminological distinction will be made, and *species* (unless otherwise stated) will always refer to the *species impressa*. On the other hand, the *conceptual* distinction and problematic relation between the physiological alteration of the sense-organs and the phenomenal content of experience will be investigated extensively in what follows.

In Descartes' views the recent findings in anatomy yet had made redundant any further argument about the lack in (pictorial) similarity between object and the impression caused by it in the sense-organ, not to mention the corresponding impression in the brain. What cried out for an argument, in his view, was rather Rubio's claim that the resulting sensory experience is still "formally similar" to the object, *viz.* that (at least in case anything goes wrong) what the subject comes to apprehend is indeed the form of the object, which he would grasp exactly as is in nature. To cast the point in Descartes' terms, it could not be *postulated* that sensory ideas represent the objects they are about precisely as they are, as (to Descartes' eyes) Rubio and all Aristotelians before him had been doing.

Descartes thought that there were indeed strong reasons to reject this *a priori* assumption. For Descartes, moreover, empirical observations like Vesalius', once integrated into the overall mechanistic account of physical phenomena he himself was advancing, spoke against Rubio's conclusions. Physiological optics, in Descartes' hands, turned thereby from being a minor discipline to a major argument in favor of his metaphysics of bodies: more than being concerned with the proper functioning of the eyes, Descartes' optics ushered in a fresh, radically diverse image of the world.

[§§24-27] Descartes' Argument against Color-Qualities

Early Modern theorists of vision had convincingly refuted the explanatory scheme defended by the Perspectivists: the eyes and the brain do not get colored when confronted with a colored object. Color-perception, therefore, could not be explained by appealing to a physiological assimilation of the object's hue. Rubio, as well as many before him, remarked that the theory of knowledge they endorsed, despite being grounded on assimilation, demanded yet no assimilation of this sort – *viz.* no actual "tinging" of the sense-organs. They agreed with the Perspectivists that knowledge consists in the cognizer grasping the form of the object by getting somehow similar to it, and that this assimilation is mediated by a likeness issued from the object – the *similitudo*, or *species*. They objected, however, that the *species* is not thereby to be understood as an image-like reproduction of the object. The *species*, they argued, does not make something known by portraying it the way a picture would do, but by "encoding" its form. The *species*, Rubio claimed, is indeed "naturally designed" as to make the cognizer perceive an object by presenting him with its form, and this is all the assimilation theory of knowledge is about, no matter what occurs in any in-between stage of the process. A *species* does not need to be itself red, therefore, in order for the cognizer to perceive this color. For some thinkers, like the Perspectivists, the assimilation taking place at the physiological stage of the visual process was to be conceived as a literal coloring of the sense-organs; for some it was not; others disregarded the issue almost altogether. They all agreed, though, that such a coloring was (in case) *implied by* the assimilation model, not the *reason* to embrace it. The true reasons for advocating assimilation as the foundation of epistemology were indeed of an eminently theoretical nature, and firmly grounded in metaphysics.

Were these reasons strong enough, though? Descartes thought they were not. Contrary to what happens with intellectual ideas, in Descartes' views 'first philosophy' cannot establish whether sensory ideas *resemble* the objects they are about, or not; that is, whether objects are colored as we perceive them to be, or not. What can only be affirmed with certainty is that the experienced differences between sensory ideas *correspond to* actual differences in the constitution of bodies: the content of sense-experience and the physical world are therefore assuredly "corresponding, but not necessarily alike" (*respondentes, etiamsi forte… non similes*).[1] Descartes, accordingly, argued that it could well be the case that sensory knowledge does not consist in the

[1] *Meditationes* VI; AT VII 81, 17-22; CSM II 56*.

assimilation of anything at all, since phenomenal and physical color could turn out to be utterly different, as different as a color and a shape are. Since *prima philosophia* had already proven to fall short of the task, whether the two are similar or not remained to be established empirically – or, to stay closer to Descartes' terms, by 'natural philosophy'.

The explanation of the physiological stage of the perceptual process gained thereby a prominence it had never had before. The promoters of the assimilation model *deduced* in fact the nature and the very existence of an assimilation at the level of sense-organs from their overall theory of knowledge, rather than by ascertaining it empirically. Descartes argued the other way around: in his views, it remained indeed to be proven that phenomenal and physical color are one in kind. Were the two similar, then it should have been concluded that *as a matter of fact* the perceptual process consists in an assimilation. Had the Perspectivists been right in their account of the visual process, there would have been some compelling reasons to take it to be the case: if color-perception would have proven to result from an actual coloring of the sense-organs, it would have been reasonable to conclude that the object which brought about such a coloring was itself colored. The Perspectivists – and, together with them, all Aristotelians – would thus have been right in ascribing to bodies quite a few more properties beside extension and its modes: color, namely, as well as (by analogous considerations) all remaining sensible qualities.

In case no such coloring occurred, and Kepler was right in his account, would there still be any reason to argue along these lines? Descartes thought there would have been none. Had color-experience been demonstrated to result from a modification of the organs' *shape* (of their figure, not of their color), so that it would be something like a chessboard-like impression on the retina to bring about the sensation of blue, it would in fact have made no sense to take color-perception as an evidence that bodies were anything more than extended things. Indeed, in case a modification in the shape of the eye's surface could account for the experience of color, a certain arrangement of the particles at the body's surface could undeniably account for the impression on the retina and, thereby, also for color-experience. Physical color, accordingly, should have been concluded to be nothing but a certain configuration of these particles, similar under no regard to the hue we perceive when the light they reflect strikes our retinas. There is no way, indeed, that a chessboard can be said to resemble blue.

The reconstruction of Descartes' empirical argument against color-qualities – and, more generally, in favor of the major thesis that material objects are *nothing but* extended things – must therefore start from considering Descartes' views on the physiological stage of the visual process, illustrated in §24. §25 investigates on the other hand Descartes' account of the

following stage of the process, the mental one, and spells out Descartes' theory of an "institution of nature". In so doing, §§24-25 set the stage for Descartes' argument against color-qualities, expounded in §26.

A caveat: the terms "physiological" and "mental" are not Descartes' and should therefore be used with some caution. The conceptual distinction between the two is yet genuinely Cartesian and receives its best known and straightforward formulation in the *Sixth Set of Replies* of the *Meditationes*, where Descartes argued that perception takes place in three steps (*sentiendi gradus*):

> To the first stage pertains only the immediate affection of a bodily organ by external objects, which cannot be anything but a motion of the particles of this organ, and the change in shape and position resulting from this motion. The second stage comprises what immediately results in the mind because of its being united with a bodily organ which is affected in this way. These are the sensations of pain, pleasure, thirst, hunger, color, sound, taste, smell, heat, cold and the like, which arises from the union and as it were the intermingling of mind and body… The third stage includes all the judgments about things located outside us which, occasioned by these motions of a bodily organ...
>
> For example, when I see a stick, it should not be supposed that certain so-called *species intentionales* fly off the stick toward the eye, but simply that rays of light are reflected off the stick and set up certain movements in the optic nerves and, via the optic nerve, in the brain, as I have sufficiently explained in the *Dioptrics*. And it is in this movement of the brain, common to us and the brutes, that the first stage of the perceptual process consists. This is followed by a second stage, which only extends to the perception of the color and light reflected from the stick; it arises from the fact that the mind is so intimately conjoined with the body that it is affected by the movements occurring in it. Nothing more than this should be referred to sensibility (*sensus*), if we wish to distinguish it carefully from the intellect.[2]

For the time being, Descartes' concluding distinction between a purely sensory and an intellectual stage of the perceptual process will be left aside. The third and last stage of the process, which has as its objects magnitude and shape (and related features of the object), is discussed only in §27, and only to resist the claim that Descartes' theory of a "natural geometry" for vision plays a role in his metaphysics of material substances. The theory of vision is indeed crucial for Descartes' metaphysics, but only for proving that bodies are *nothing but* extended things. That they are, in the first place, extended is not correspondingly established in or by the third stage of the perceptual process, but only by considering the innate idea of extension (a line of reasoning already articulated in the first part of this work). Unless otherwise stated, in what follows the *physiological* and the *mental* stage of the perceptual process always refer,

[2] *Responsiones* VI; AT VII 436, 26 - 437, 25; CSM II 294-95*.

respectively, to the first and the second stage of the *Meditations* taxonomy. The gap between these two is actually much wider than the one between the second and the third stage. Whilst the latter results in fact from distinguishing between *attributes* of one and the same substance (i.e. between two faculties of one and the same mind), the former follows from a distinction between *substances* – the *res extensa* and the *res cogitans*, namely. For Descartes both sensibility and intellect are yet without doubt and right from the beginning faculties of the *mind* – "of the purely spiritual power (*vis pure spiritualis*) through which we do properly know things", as he styles it in the *Rules* – so that both fall safely on the same side of the body-mind divide.[3] Both the perception of color and the perception of shape are therefore to be ascribed to the mind, whereas the modification of the sense-organs is for Descartes a purely bodily affair.

The distinction between a physiological and a mental stage of the perceptual process is thus a straightforward consequence of Descartes' dualism. As the previous chapters have shown, such a distinction would have been rejected by the Perspectivists, for whom the coloring of the eye and the perception of a certain color were indeed one and the same thing. As in Rubio's case, some late promoters of hylomorphism were on the other hand already defending a distinction along Descartes' lines, without which it would not have been possible to claim (as Rubio did) that the impression on the sense-organs and the corresponding sensation were dissimilar. At the same time, though, Descartes admitted that in the case of shape-perception the actual shape of the body, the corresponding figure impressed on the retina and the shape accordingly perceived were (at least in some regards) similar.[4] The dissimilarity between physiological impressions and the corresponding ideas is not therefore to be understood as a consequence of Descartes' dualism: to distinguish, in force of the body-mind dualism, between two stages of the perceptual process does not in fact decide by itself how the objects of these two stages relate. §15 and §17 have analogously shown that Descartes' dualism does not establish by itself whether bodies are nothing but extended things or that one should ascribe to them some other qualities too, such as color-qualities. One cannot thus simply appeal to dualism in order to settle the issue at stake, and §26 shows that, contrary to received wisdom, even Descartes' criticism of the *species intentionales* is not guided (not chiefly, at least) by metaphysical concerns of this sort. By distinguishing between a physiological and a mental stage of the perceptual process Descartes was not surreptitiously suggesting an answer. He was only setting the stage to raise it properly.

[3] *Regulæ* XII; AT X 415,13-14; CSM I 42*.

[4] As already remarked in §4, for Descartes such a similarity is nonetheless only residual and irrelevant for the issue at stake.

§24. The physiological stage of the perceptual process

As it has just been shown, for Descartes nothing pertains to the first stage of the perceptual process – the physiological stage – but "the immediate affection of a bodily organ by external objects, which can consist in nothing but the motion of the particles of this organ, and the change in shape and position resulting from this motion".[1] In the *Meditations*, mostly driven as he is by epistemological concerns, Descartes is comprehensibly quite sketchy about the physiology of the visual process, limiting himself to remark that

> When I see a stick, it should not be supposed that certain so-called *species intentionales* fly off the stick toward the eye, but simply that the rays of light are reflected off the stick and set up certain movements in the optic nerves and, via the optic nerve, in the brain, as I have sufficiently explained in the *Dioptrics*. And it is in this movement of the brain, common to us and the brutes, that the first stage of the perceptual process consists.[2]

In Descartes' view the physiological stage of the process that leads to color-perception amounts indeed to nothing but these movements of the internal sense organ (the brain), induced by a movement of the external sense organ (the eye) and transmitted to the former by the optic nerves. The structure of the chapter follows this threefold model, which Descartes had already articulated in detail in his previous works. It starts from the theory of the sensory nerves (§24.1): Kepler's dilemma about whether it was the retinal impression to ascend to the brain and, thereby, to the mind, or rather the other way around, was in fact still calling for an answer. As shown in the following pages, Descartes argued that the former option was in fact the case: the perceptual process according to Descartes proceeds in fact from the *external* (§24.2) to the *internal* organs (§24.3). This physiological model, once integrated with Descartes' account of light transmission and the institution of nature makes clear why Descartes opposed the concept of *species intentionalis* for both the *species in medio* and the *species in organo*, as §26 is intended to show..

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[1] *Responsiones* VI; AT VII 436, 26 - 437, 2; CSM II 294*: "Ut recte advertamus quænam sit sensûs certitudo, tres quasi gradus in ipso sunt distinguendi. Ad primum pertinet tantum illud quo immediate afficitur organum corporeum ab objectis externis, quodque nihil aliud esse potest quàm motus particularum istius organi, & figuræ ac sitûs mutatio ex illo motu procedens".

[2] *Ibid.* 437, 12-19; CSM II 295*: "Ut, exempli causâ, cùm baculum video, non putandum est aliquas *species intentionales* ab ipso ad oculum advolare, sed tantùm radios luminis, ex isto baculo reflexos, quosdam motus in nervo optico, &, illo mediante, etiam in cerebro excitare, ut satis prolixe in *Dioptricâ* explicui; atque in hoc cerebri motu, qui nobis cum brutis communis est, primus sentiendi gradus consistit".

§24.1. Nerve transmission

Intrigued by the title, which announces an investigation "Des sense en general", the reader of the *Fourth Discourse* of the *Dioptrics* is soon to find himself stuck in a detailed description of the structure of the nerves, abruptly followed by a criticism of the *species* doctrine. Fastidious and negligible at first glance, the questions addressed so far makes however clear the true importance of these physiological remarks, together with the error of the main English translators in leaving them out.[1]

The reader aware of the Perspectivist and Early Modern background cannot but be puzzled by Descartes' statement that the nerves (all nerves) are hollow. Descartes, admittedly, does not speak of a detectable foramen: he had indeed never seen anything like it in the manifold observations he himself had performed. Still, Descartes contends that the nerves are "like little tubes", which contains some fibers that "extends in the form of little threads throughout the length of these tubes, from the brain whence it originates, all the way to the extremities of the other members" and which are inflated by "the animal spirits, that are like a very subtle wind".[2] Descartes does not provide empirical support in favor of this account – there is none, expect for the fibrous nature of the nerves – but affirms that "it must be assumed" (*il faut penser*) that this is actually the case in order to solve a few major problems of the received physiological theories.[3] Descartes, more in particular, is critical of Galen's distinction between two kinds of nerves, the sensory and the motor ones, which he denounces as "very repugnant to experience and reason".[4] He claims that these two processes can in fact be better explained by having each nerve performing both functions, carried out by two different constituents of one and the same nerve:

> To avoid these difficulties, then, it must be assumed that it is the spirits flowing through the nerves into the muscles, and expanding them more or less… which cause the movement of all the members, and that it is the small threads composing the interior substance of the nerves that are used for sensation (*servent aus sens*).[5]

Contrary to what happened with the Perspectivists, therefore, the foramen that would

[1] The Cottingham edition decided not to translate from 109, 25 to 112, 5; see CSM I 165.

[2] *Dioptrique* IV; AT VI 110, 2-18; O 87-88*.

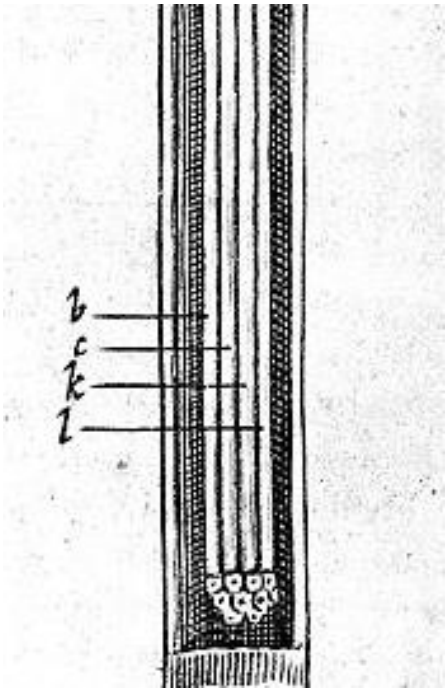
[3] *Ibid.* AT VI 110, 7.

[4] *Ibid.* AT VI 110, 31 - 111, 1; O 88.

[5] *Ibid.* AT VI 111, 6-13; O 88*.

enable the passing of the spirits is not intended to transmit any color. Descartes indeed postulates that *all* nerves are hollow, rather than the optic ones only, because what he aims at ensuring is not the flowing motion of the *species* from the eye until the brain, but the overall motility of the living body. The age-old presupposition of the Perspectivists is thus put at the service of a completely different conception.

Descartes argues that the spirits have still a role to play in the perceptual process, albeit only a subsidiary one. He is indeed worried that the bundle of filaments transmitting sense-impressions gets tangled or broken because of the limbs' manifold movements. Besides bringing about these motions, Descartes thus construes of the spirits inflating the nerve tube as a sort of air buffer for the signal-transmitting wires:



> These small fibers, being enclosed… in tubes that are always inflated and held open by the spirits which they contain, do not crowd or impede each other in any way, and are extended from the brain to the extremities of all parts which are capable of any sensation, in such a way that, however slightly we touch and move the spot in these places where any one of the fibers is attached, we also move at the same instant the place in the brain from which it comes; just as pulling one of the ends of a very taut cord makes the other end move at the same instant. For, knowing that these fibers are so enclosed in the tubes that the spirits always keep slightly inflated and open, it is easy to understand that, even if they were much thinner than those spun by silkworms, and weaker than those of spiders, they still might be extended from the head to the most distant parts without any risk of their breaking, nor would any of the various positions of the limbs impede their movements.[6]

Fig. 10: *De Homine, figuris & latinitate donatus a Florentio Schuyl* (Leiden 1662), 34, fig. VI (& XIII).

The details of this physiology are indeed fanciful, and will be empirically disproven within a few years. Rather than on the specific solutions worked out by Descartes, it makes therefore better sense to focus on the *reasons* that led him to postulate such a structure for the nerves.[7]

[6] *Ibid.* AT VI 111, 15 – 112, 5; O 88-89*.

[7] On the interplay between Descartes' physiological theories and his theory of the mind see, more in general, Gary Hatfield, "Descartes' Physiology and its Relation to his Psychology" in John Cottingham ed., *The Cambridge Companion to Descartes* (Cambridge: Cambridge University Press 1992), 335-70.

A first question Descartes' physiology had to answer was of course Kepler's quandary whether it is the retinal image to proceed to the brain or it is rather the soul to "go forth to meet this image". In one of the very few admissions of an intellectual debt, Descartes celebrated in fact Kepler as his "first master in optics"[8] and perused his work to the point that a theologian of his time protested that only the *Bible* deserved to be studied so carefully, whereas the only other book he had seen on Descartes' desk were Ovid's *Metamorphoses*.[9] The problems in optics taken up by Descartes during the 1620s were indeed precisely the ones left open by Kepler, first of all the determination of the so-called anaclastic curve mentioned in the *Rules*.[10] Besides these physico-mathematical questions, however, Descartes had also inherited from his master the physiological and epistemological problem of color perception. Kepler could "leave to the natural philosophers to argue about" color transmission and color perception and label his remarks on the topic nothing but a "digression".[11] Descartes, though, who was proudly professing to be one of these natural philosophers, had to devise a solution on his own.

Of Kepler's two tentative proposals, Descartes is likely to have rejected right away the latter, which envisaged a descent of the soul "from the headquarters of the cerebrum outside to the visual nerve itself and the retina". Descartes' concerns about the unified phenomenal character of sense-perception, together with the claim that only a joining together of the sensory stimuli in *one* internal organ could account for it, go in fact back to the 1620s. As a matter of fact, there is no piece of evidence that Descartes had ever entertained a different view on the matter, although it is impossible to reconstruct his thoughts while he was reading Rubio as a school boy. Descartes could not even accept Kepler's phrasing of the former alternative, though, since he did not think of the spirits as instrumental in transmitting the light image. Kepler's baroque metaphors about the "tribunal" and the "magistrate" of the soul, coupled with the

[8] To Mersenne, 31 March 1638; AT II 86: "Kepler a été mon 1er maître en optique, & que je crois qu'il a été celui de tous qui en a le plus su par ci-devant".

[9] Jacobus Revius, *Kartesiomania* (Leyden: H. de Vogel 1654), 307-308. Revius met with Descartes in Deventer, where Descartes resided approximately between May 1632 and February 1634; cf. Jacobus Revius, *A Theological Examination of Cartesian Philosophy: Early Criticism (1647)*, ed. Aza Goudriaan (Leiden-Boston: Brill 2002), 7-9. Ovid was most probably used by Descartes as a help for conceiving of the primordial Chaos which opens *The World* and Descartes' attempt to replace the creation of the universe as presented in the *Book of the Genesis*. In *Le Monde* VI Descartes does indeed explicitly mention the "the poets'" description of this "Cahos"; AT XI 34-35.

[10] Cf. *Regulæ* VIII; AT X 393, 22 - 395, 16. See also the already quoted To Mersenne, 31 March 1638; AT II 86. For Descartes work in optics between the late 1620a and the early '30s, see John Schuster, *Descartes' Agonistes: Physico-mathematics, Method & Corpuscular-Mechanism, 1618-33* (Dordrecht: Springer 2013).

[11] Kepler, *Ad Vitellionem Paralipomena* 168, 170; Donahue 180, 181.

"headquarters" and the "lower courts" of the brain, moreover, did not sound so much as concepts in disguise, but as the only resources left once all rational explanations had proven to fail. Kepler was keenly aware of it. The fact he himself had not been able to figure out a solution does not however undermine Kepler's merits and historical role: his explicit formulation of the problem, reiterated for over fifteen years, was indeed crucial in making Descartes and all scientists of the time realize that the problem facing vision theorists could no longer be eluded, and that the traditional appeal to visual spirits could no longer go without saying.

Musing on the topic, in the late 1620s Descartes became convinced that the transmission of the sense-impression from the external sense-organ to the brain took place "instantaneously and without the actual transit of anything real" (*eodem instanti & absque ullius entis realis transitu*) by means of the nervous fibers.[12] The sophisticated solution advanced in the early '30s was only intended to make sure that these fibers could work properly, by entrusting the spirits with the task of keeping them in tension, untangled and intact. The gist of the theory was yet still the same, and it will remain the same throughout the rest of Descartes' life, as attested by Descartes' doctrinal exposition of his natural philosophy in the *Principles*, published one century after Vesalius' work:

> We observe no differences between the various nerves which would support the view that different nerves allow different things to reach the brain from the external sense organs, or that anything reaches the brain except for the local motion of the nerves themselves. And we see that this local motion presents us (*exhibere*) not only with the sensations (*sensus*) of pain and pleasure, but also with those of light and sound. If someone is struck in the eye, so that the vibration of the blow reaches the retina, he will see many sparks of flashing light, and yet this light is not outside his eye. And if someone puts a finger in his ear he will hear a throbbing hum which comes from the movement of air trapped in the ear… Anything passes (*transire*) from the external sense organs to the brain except for motions of this kind.[13]

That a hard stroke on the eye results in the subject seeing some sparkles – the phenomenon is especially noticeable if the eye is closed – was already been noticed in antiquity. Some philosophers took it to reveal the presence of some sort of fire in the eye, some others (like

[12] *Regulæ* XII; AT XII 414, 3-4.

[13] *Principia* IV 198; AT VIII-1 321, 24 - 322, 5 & 24-26; CSM I 284*. The Cottingham edition translates *exhibere* as "produce", but "present with" seems more accurate. The French authorized translation reads "excitent en nous"; AT IX-2 316.

Aristotle) described it as a quite implausible instance of reflection.[14] Descartes, on his part, interpreted this experience very differently: in his views, the punch-experience opened the door to a knock-down argument against the Perspectivist account of vision, based as it was on the propagation of a pictorial *similitudo* from the object to the brain. Descartes pointed out that there is indeed no way in which the "infinity of fireworks" so unfortunately experienced could be maintained to be similar to the punch that provoked them. Therefore, Descartes concluded, "there need be no resemblance between the ideas that the mind conceives and the movements which cause these ideas":

> You will readily believe this if you note that it seems to those who receive some injury in the eye that they see an infinity of fireworks and lightning flashes before them, even though they shut their eyes or else are in a very dark place; so that this sensation can be attributed only to the force of the blow which moves the small fibers of the optic nerve, as a strong light would do. And if this same force touched the ears, it could cause some sound to be heard; and if it touched the body in other parts, could cause it to feel some pain. And this is also confirmed by the fact that if you sometimes force your eyes to look at the sun, or some other very strong light, they retain its impression for a short time afterward, in such a manner that, even if you keep them shut, you seem to see various colors which change and pass from one to the other as they grow weaker. For this can only proceed from the fact that the little fibers of the optic nerve, having been moved in an extraordinarily strong manner, cannot stop themselves as soon as is their custom; instead, the agitation which is still in them after the eyes are closed, not being sufficiently great to represent this very strong light which caused it, represents the less vivid colors.[15]

Therefore, Descartes argues, the assimilation of a color *species* is not always needed for visual experience to occur. The experience of a punch in the eye as well as afterimages makes clear that there are in fact at least *some* instances of color perception that cannot be explained in such a way. Descartes aimed at a much stronger conclusion, though. Objecting to Descartes' doubt about the existence of an external world, Gassendi contends that the only reason why blind people do not have any idea of color – i.e. no color perception at all – is because external bodies have not been able "to send in the minds of these unfortunates any image of themselves" (*speciem in mentem immittere*).[16] Descartes' reply is as elliptical as is startling:

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[14] Cf. *De Sensu* 437[a]23-27. Aristotle defended the latter view, claiming that one sees "sparks" only because of a fast movement of the "black" of the eye (by which Aristotle probably indicates not only the pupil, but also the lens) which, being smooth and in the dark, is said to "appear to shine", as it is claimed to be the case for the head of certain fishes or the "dark fluid" of the cuttlefish.

[15] *Dioptrique* VI; AT VI 131, 7 - 132, 3; O 101-102.

[16] *Objectiones* V; AT VII 283, 6-10; CSM II 197*.

> How do you know that there is no idea of color in a man born blind? Sometimes, in fact, the sensations of light and color are aroused (*excitentur*) in us even though our eyes are closed.[17]

Starting from the experience described in the *Dioptrics*, in his reply to Gassendi Descartes seems thus to entertain the thought that, by the same token, an appropriate *direct* stimulation of the brain could bring about a sensation of color, without passing through the retina or, more in general, the eye. Or, at least, this piece of his theory is consistent with and would be supported by this much later discovery in neurophysiology. It almost hypothesizes it, one could say.

The discovery that the optic nerves are not light-conductive, at any rate, prompted Descartes to turn the previous "some" into "all of them": the experience of red does not result because of anything red travelling behind the retina. As a matter of fact, it does not depend on the actual transmission of anything at all: for Descartes, indeed, the only thing to be transmitted by the nerves is motion, which according to his cannot however be conceived as something concrete – as an *ens reale*, as he puts it – creeping through the nerve-tubes. Descartes construes in fact of motion as the *modus* of the *res extensa*, that is, as the property of a body that cannot exist but as the property of body, not as something in its own right.

Descartes, as already mentioned, appoints the single nervous fibers to transmit this motion. In Descartes' view they do it by simply moving themselves, and he built them in such a way as to make sure that this movement propagates in no time from one extremity of the fiber to the other, "just as, pulling on one end of a cord, one simultaneously rings a bell which hangs at the opposite end".[18] Or, following Descartes' first any maybe most felicitous metaphor to illustrate the point, as pens transcribing on the brain the impressions traced by the external object on the retina:

> When an external sense organ is set in motion (*movetur*) by an object, the figure that it receives is conveyed (*deferri*) at one and the same moment to another part of the body, known as the 'common sense', without any entity really passing from the one to the other (*eodem instanti & absque ullius entis realis transitu*). In exactly the same way, I understand that, while I am writing, at the very moment when individual letters are traced on the paper, not only does the point of the pen move, but the slightest motion of this part cannot but simultaneously affect the whole pen. All these various motions are traced out in the air by the tip of the quill, even though I do not conceive of anything real passing from one end to the other

[17] *Responsiones* V; AT VII 363, 10-13; CSM II 251*. See also From Hyperaspistes, July 1640; AT III 409.

[18] *Homme*; AT XI 142, 4-6; Hall 34.

(*etiamsi nihil reale ab uno extremo ad aliud transmigrare concipiam*).[19]

According to Descartes the traces on the brain are therefore to be understood as *transcripts* of the corresponding impressions on the retina rather than as "small paintings" (*petits tableaux*) creeping into the nerves and throughout similar to the objects they are supposed to depict. The physiology of the nervous system makes in fact sure that no color can reach the brain, contrary to what "our philosophers commonly suppose".[20] Taking up a seemingly irenic attitude toward received views, Descartes at one point concedes that one could keep on claiming that objects "truly transmit their images to the inside of our brain", in case he is especially fond of this way of speaking. He warns his readers, though, that no image must be similar under any regards to the object it represents, in order to represent it successfully, as clearly attested by *tailles-douces* (intaglio printings or, as the term is usually translated, engravings):

> You can see that engravings, being made of nothing but a little ink placed here and there on the paper, represent to us forests, towns, men, and even battles and storms, even though, among an infinity of diverse qualities which they make us conceive in these objects, only in shape is there actually any resemblance. And even this resemblance is a very imperfect one, seeing that, on a completely flat surface, they represent to us bodies which are of different heights and distances, and even that following the rules of perspective, circles are often better represented by ovals rather than by other circles; and squares by rhombi rather than by other squares; and so for all other shapes. So that often, in order to be more perfect as images and to represent an object better, they must not resemble it.[21]

Descartes' concession that the impression on the brain is not utterly dissimilar to the object that caused it – and that the impression, accordingly, represents – should not lead usastray. Besides urging that this similarity is quite poor, Descartes' example makes clear that it only

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[19] *Regula* XII; AT XII 413, 21 - 414, 12; CSM I 41-42*. Kepler's tentative proposal that the presence of a continuous body in the nerves (the spirits) could account for the transmission of the retinal impression was certainly crucial for Descartes. Kepler, however, took the transmitting body to be a fluid and implied that the transmission takes time, as suggested by the model of the stone cast in a water pool (the claim would have been in line with the Perspectivists' teaching; Alhacen, in particular, insisted again and again that the perceptual process takes some time, though too short for the perceiver to notice). By ascribing the transmission of the retinal image to a rigid body, on the other hand, Descartes could conclude that the transmission is instantaneous – a truly novel claim in vision theory, to the best of my knowledge.

[20] Cf. *Dioptrique* IV; AT VI 112, 11-17; O 89*: "For, inasmuch as they do not consider anything about these images except that they must resemble the objects they represent, it is impossible for them to show us how they can be formed by these objects, received by the external sense organs, and transmitted by the nerves to the brain".

[21] *Ibid.* AT VI 113, 8-25; O 90.

regards *shapes* (as remarked in §27, Descartes argues that it is not however by virtue of this resemblance that the perceiver comes to know the shape of an object). Descartes does not address the issue expressly, but this is arguably the reason why he shifted from speaking of *tableaux* and *images* to considering intaglio printings, despite the fact the perspective principles Descartes is referring to were employed in paintings no less than in etchings. As he implicitly points out there is however a crucial difference between the two, inasmuch as *tailles-douces*, contrary to paintings, are "made of nothing but a little ink" – they come in black and white. According to Descartes, in transcribing the retinal impression onto the brain the nerves do not indeed act like a paint brush, but as a burin (or as a pen, to come back to the analogy of the *Rules*).

With his example of the engravings, therefore, Descartes was not making a concession to the pictorial model of the Perspectivists, but turning it on its head to reaffirm a crucial point of his theory of perception: no color can propagate from the retina to the brain. All the more, therefore, from the external object.

§24.2. External sense organs

As the previous passages have shown, the thesis that the nerves cannot *transmit* anything but motion goes hand in hand with the claim that the nerves are *responsive to* anything but motion (the only kind of motion admitted by Descartes' philosophy being local motion, i.e. a change in location).[1] Therefore, as far as the external sense organs are concerned, only the modifications they undergo by having their shape modified because of an impact could according to Descartes be relevant to the perceptual process. Indeed, in order for the nerves to be set in motion, something must physically act upon them, via the membranes they innervate. Starting from the received metaphysical tenet according to which no action can take place at a distance, Descartes thus reduces the action of external objects upon the external sense organs – and, hence, upon the nervous system – to an impression induced by a contact, where the term impression is to be taken in a strict literally sense, as the actual (although sometimes mediated) impinging of the external object on the sense organ. The Aristotelian analogy of the external object acting as a signet upon the cognizer, who takes on its shape as a piece of wax would do, is thus taken by Descartes as a statement of fact:

> In so far as our external senses are all parts of the body… they sense only by being acted upon, in the same way in which wax takes on a shape (*figura*) from a seal. It should not be thought I have a mere analogy in mind here: we must think of the external shape of the sentient body as being really changed by the object, in the same way the shape of the wax surface is changed by the seal. This is the case, we must admit, not only when we feel some body as having a shape, as being hard or rough to the touch etc., but also when we have a tactile impression of heat or cold and the like. The same is true of the other senses: thus, in the eye, the first opaque tunic (*primum opacum*) receives a shape impressed upon it by multi-colored light (*figuram impressam ab illuminatione varijs coloribus indutâ*). Likewise, in the ears, the nose and the tongue, the first membrane which is impervious to the passage of the object (*prima cutis objecto impervia*) takes on a new shape from the sound, the smell and the flavor, respectively.[2]

In the *Dioptrics* Descartes describes the retina as "a sort of extremely tender and delicate flesh" constituted by the extremities of the optic nerve's filaments, interwoven with countless veins and arteries (which, obviously enough, play however no role in the perceptual process).[3] The *Rules* suggest the very same account, at least as far as the nervous filaments are concerned,

[1] As clearly implied already by *Regulæ* XII; AT X 425, 20 - 427, 2.

[2] *Ibid.* AT XII 412, 14 – 413, 2; CSM I 40*.

[3] *Dioptrique* III; AT VI 106, 9-18; O 84. Cf. *Dioptrique* V; AT VI 115, 7-8; O 91.

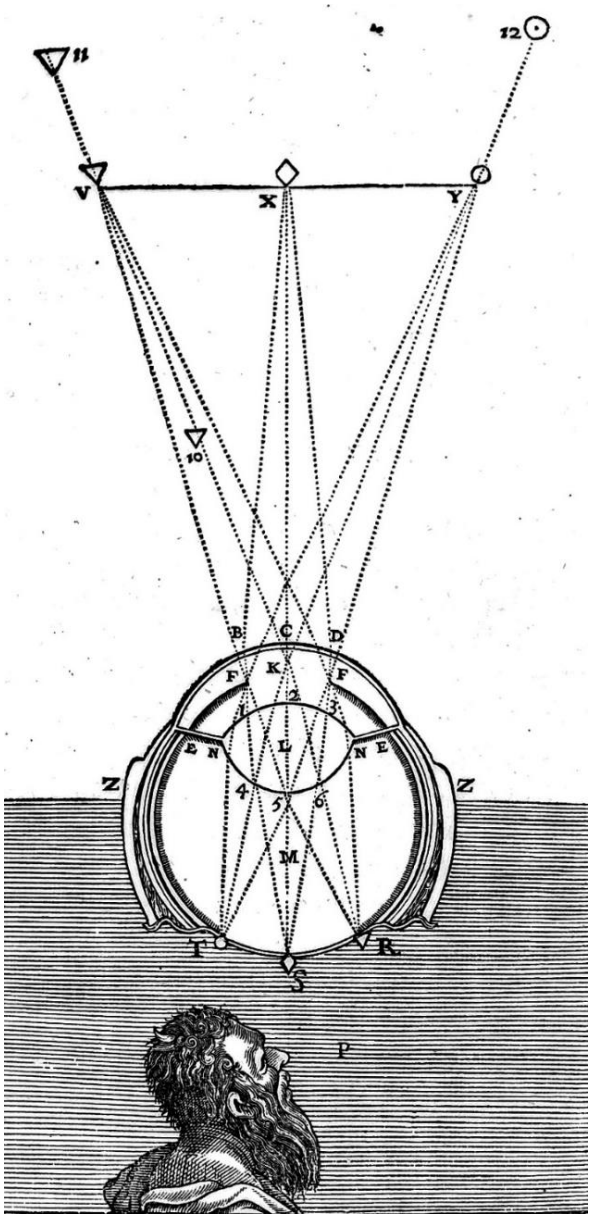
as already here Descartes attributes the transmission to the brain of the retinal image to nothing but the nerves. To nothing but the nerves means that the spirit do no enter the process anyhow. In Descartes' physiology of the eye there are indeed no spirits at all *within* the eye, neither to inflate nor to "vitalize" it, a claim that even by itself would mark a major break with received views. The ocular impression reduces accordingly to a stimulation of the nerves, conceived as a physical impact on their extremities of something coming from outside the eye (light rays, in the case of visual perception). In Descartes' theory the spirit can no longer transmit colors simply because they are never faced with them and, accordingly, cannot be impressed by them. Even if they were this would not help much, actually, since for Descartes the spirits are no longer transparent and, thus, of no more help than the filaments in propagating red *qua* red to the brain.

One should indeed be very careful in interpreting the experiment with the cow eye described by Descartes in the *Dioptrics*. The experiment (Gaspar Schott claims) had been originally devised by an unnamed anatomist in Rome, who would have then taught it to Athanasius Kirchner and to the above-mentioned Christoph Scheiner, which reports it as an empirical confirmation of Kepler's theory that the pencil of light rays coming from one point were made by the refractive surfaces of the eye to converge in one point on the rear surface of the eye – on the retina, namely – although in a reversed and inverted order. All the scientists mentioned are Jesuits, and it is well known that Descartes was fully conversant with the writings of the members of this order (the order of his teachers), as it was immediately clear to Isaac Beeckman upon meeting with him.[4] Descartes in the *Dioptrics* presented the experiment as follows:

> In order to perceive, the mind need not contemplate any images resembling the things that it senses. But this makes it no less true that the objects we look at do imprint very perfect images on the back of our eyes. Some people have very ingeniously explained this already, by comparison with the images that appear in a chamber, when having it completely closed except for a single hole, and having put in front of this hole a glass in the form of a lens, we stretch behind, at a specific distance, a white cloth on which the light that comes from the objects outside forms these images. For they say that this chamber represents the eye: this hole, the pupil; this lens, the crystalline humor, or rather, all those parts of the

[4] Cf. AT X 52: "Hic Picto cum multis Jesuitis alijsque studiosis versatus est". On the history of eye experiment, see Gaspar Schott, *Magia Universalis Naturæ & Artis* (Bamberg: Schönwetter 1677), I 4, pp. 202-203. The importance of this text by Schott has been pointed out by Ettore Lojacono in his edition of Descartes, *Opere scientifiche* (Utet: Torino 1983), II 237.

eye which cause some refraction; and this cloth, the interior membrane, which is composed of the extremities of the optic nerve.



But you will be even more certain of this if, taking the eye of a newly deceased man, or, for want of that, of an ox or some other large animal, you carefully cut through to the back the three membranes which enclose it, in such a manner that a large part of the humor *M* which is there remains exposed without any of it spilling out because of this. Then, having covered it over with some white body, *RST*, thin enough to let the daylight pass through it (as for example with a piece of paper or with an eggshell), place this eye in the hole of a specially made window such as *Z*… no other light must enter the room except that which will be able to penetrate through this eye, all of whose parts, from *C* to *S*, you know to be transparent. For when this has been done, if you look at that white body *RST*, you will see there, not perhaps without admiration and pleasure, a picture which will represent in natural perspective all the objects which will be outside of it.[5]

Fig. 11: Descartes, *Dioptrique* V; AT VI 116.

A philosopher quite more traditional than Descartes like Libert Froidmont – better known as Fromondus (1585-1653), author of the well-known *Labyrinthus, sive de compositione continui* (1631) and editor of Jansenius' *Augustinus* (1640) – intended the experiment as a direct confirmation of the Perspectivists' account and was surprised that Descartes could deny the existence of the *species* – especially of the species in organo. Indeed, he protested,

[5]*Dioptrique* V; AT VI 114, 15 - 115, 31; O 91-93*.

> how can he [Descartes] deny the existence of the intentional *species* of color, when these are nothing but the images that… he himself says to be depicted on the bottom of the eye, and to be necessary to see colors?[6]

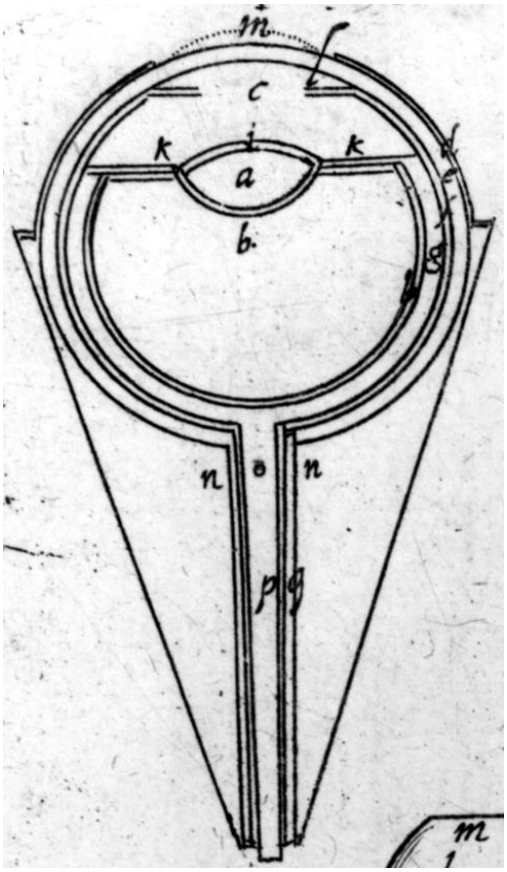
Descartes, in the passage just quoted, does indeed speak of a *peinture*, thereby apparently falling back into the Perspectivist concepts he had been taken great pain to free himself from. It is yet crucial to notice that Descartes only intended to describe what an external observer (like the bearded man of the etching above) would experience in case the retina would be replaced by "some white body, thin enough to let the daylight pass through it", that Descartes accordingly qualifies as "transparent". The only goal of the experiment is to confirm Kepler's theory of the inverted retinal image, not to account for the physiological stage of the visual process. According to Descartes, the question about the nature of this image is indeed still open and in order to determine it one should not pay heed to the colorful appearances that some external observer would perceive to be formed on a piece of paper, but ask himself how the "extremely tender and delicate flesh" constituted by the extremities of the optic nerve's filaments reacts to light rays and, more in general, what the nerves are responsive to. To nothing but impact, reads Descartes' reply, nerves having to be conceived as rods and pens better than as tunnels through with the *species* could find its "glowing" way to the brain. There is therefore no way, in Descartes' physiology, that a color could "tinge the final sensor" as requested by the Perspectivists. Although a modern reader can easily fail to notice it, operating as he is with a largely – if not fundamentally – Cartesian model of color perception, the claim that "multi-colored light" is perceived because of an impression on an *opaque* organ should have sounded almost as nonsense to most of Descartes' contemporaries, as Descartes was well aware of.

It should in fact be remembered that the major concern of Aristotle's theory of vision was to establish a *transparent* uninterrupted link between the object and the perceiver, so that colors could travelled unaltered through all the intervening space and enter, always unchanged, the transparent eye. Any coloring of this see-through bridge (either in the eye or in the medium, as when looking at the world through a glass of wine) was said to result in error since, in passing, the true color of the object would be dyed otherwise. The entire point of having the eye transparent was that only what is lacking a color of its own was thought to be able to literally

[6] Fromondus to Plempius, 13 September 1637; AT I 405: "Quo modo... negat Species Intentionales colorum, cum nihil aliud sint quam imagines illæ quas alibi fatetur in fundo oculi depingi, & necessarias esse ad visionem colorum?".

"become" all colors, turning red when confronted with something red, rather than watering it down to amber. So was the case with jaundice, for example, when the perceiver was said to see everything yellowish because the eye itself has been made yellow by the disease. The Perspectivists made this theory their own and, therefore, could not but locate "the seat of the visual power" at a transparent part of the eye. Following Galen and because of other demands of the theory, they specifically chose the crystalline lens (which, as the name clearly suggests, is indeed transparent). For the issue at stake, however, is even more important to notice that their theory ruled out right from the beginning any opaque surface, as for example the choroid or even the retina. If the retina was credited with a role in the visual process this was only to "transport the spirits through its nerves", as Averroes put it. The retina was in fact understood as being a sort of propagation of the inner sheath of the optic nerve (actually, all eye's tunics were regarded as some extensions of either the nerve's interior or its exterior coat).[7] The retina, therefore, as part of the optic nerve, was only taken to be responsible for providing the eye with spirits, which in turn were to transmit to the brain the color that had tinged the crystalline lens. When Kepler deprived the lens of any like a function to ascribe it to the retina, he had indeed immediately to face the objection that the retina, contrary to the lens, is not transparent, but with a color of its own. According to the Perspectivists' model this would in fact have implied an inescapably altered perception of color, a sort of jaundice congenital to all mankind – possibly to all beings endowed with sight.

[7] See David C. Lindberg, "Did Averroes Discover Retinal Sensitivity?" in *Studies in the History of Medieval Optics* V.



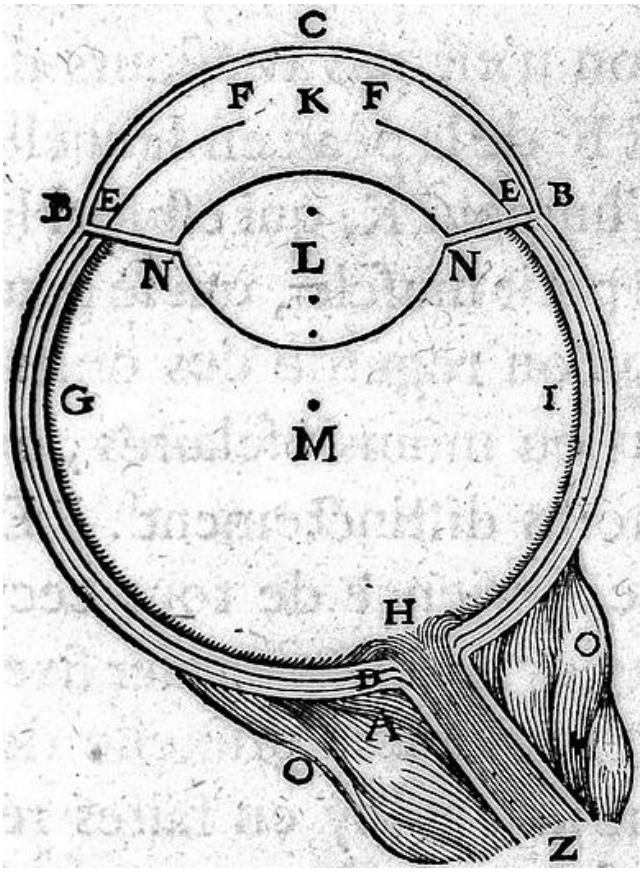


Fig. 12: Felix Platter's diagram of the eye, reproduced by Kepler in *Ad Vitellionem Paralipomena* 177; Donahue 188.

Fig. 13: *Dioptrique* III; AT VI 106 (lacking any depiction of the eye in the *Regulæ* – at least as far as we know). It should be noticed that Descartes corrects Platter in representing the optic nerve as not in line with the visual axis. This standard anatomic error was due, once again, to the demands of the Perspectivist Scheme. Of course, as soon as the idea of a light propagation along the optic nerve is abandoned and replaced by an impulse transmission via the nervous fibers (carefully indicated in the *Dioptrique* diagram) it becomes completely irrelevant where exactly the nerve joins the eye. The matter could therefore be set empirically, at last.

As for the color of the retina the two anatomists Kepler based his account on, Felix Platter and Jan Jessenius, disagreed, the latter arguing that the retina is bluish, the former, more traditionally, reddish. Kepler, who confessed to have never performed a dissection, seems nonetheless to favor Platter, and thus somewhere else refers to the retina as "the white surface, tinged with red" (*albus subrufus paries*).[8] Kepler, at any rate, wished his theory to remain noncommittal on this point. His opponents would have probably agreed on that, arguing that the question was not whether the retina was kind of blue or red, but that it had a color at all, whatever this turned out to be. To counter this objection Kepler worked thus out a quite artful theory of colors, listing among its corollaries that

[8] Kepler, *Ad Vitellionem Paralipomena* 168; Donahue 180*.

> the rays that have flowed to black surfaces are perceived most distinctly, and to white ones most evidently; and if a surface be a mean between black and white, such as blue, white washed with red (*diluta rubeo alba*), and the like, they will stand about equally in rendering both the individual colors and their differences.[9]

The transparent crystalline humor is so replaced by Kepler by an opaque membrane of a median color, ideally at equal distance from the extremes of black and white (it was most probably for this reason that Kepler preferred to side with Platter, being red a better candidate the blue under this regard). Being potentially all colors and being to the midway between them is not quite the same thing, though. Notwithstanding all his efforts to rescue more traditional views, Kepler's theory was already pointing in a completely different direction.

This the state of the art at the time the *Rules* were penned. Neither in that work nor in the ones to come has however Descartes ever remarked on the color of the retina. The issue is indeed simply beside the point once Kepler's *impressio physica & admirabilis* is identified with a straightforward instance of collision onto the nerves' extremities that form the retinal membrane. Although Descartes' theory of collision does not go without problems, it would in fact be hard to name it an "astonishing" phenomenon.[10] For Descartes, the impression of a color on the retina is thus as simple to understand as the impression of a seal on the wax, where it is straightforward to understand that the color of the wax plays no role.

The theory, obviously enough, implies that the impressions of different colors on the retina amount to nothing but different figures (and, by the same token, that light rays of different colors must be understood as signets of different shapes). And this is indeed precisely what Descartes argues to be the case:

> What troublesome consequences could there be if – while avoiding the useless assumption and thoughtless introduction of some new entity – we do not deny anything of what others have preferred to think on color, but only abstract from every of its features apart from its having [the nature of] a figure, and conceive of the difference between white, blue, red, etc. as being like the difference between

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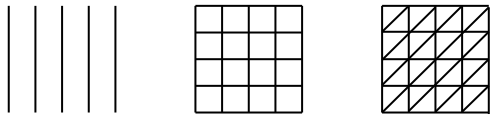
[9] *Ibid.* 25; Donahue 38-39. On the importance for the Aristotelian to have the sensitive part of the eye transparent and Kepler's attempts to deal with the coloring of the retina, see Tawrin Baker, *Color, Cosmos, Oculus*, especially 284-97. This work is very important, from a more general point of view, for its careful analysis of the concept of "opaque" (and companions) in the 16th and early 17th century.

[10] On the epistemological (and quite unexpected) intricacies of Descartes' concept of collision and body-body interaction, see Daniel Garber, "Understanding Interaction: What Descartes Should Have Told Elisabeth" in Id., *Descartes Embodied: Reading Cartesian Philosophy through Cartesian Science* (Cambridge: Cambridge University Press 2000), 168-88.

the following figures, or similar ones? [11]



The passage, it should be noticed, is unclear about whether this figures model refers to the color *as they are on the retina* (i.e. to the sense-impression) or to colors *as they are in external bodies* – i.e. as physical properties bodies do possess. The literature has tended to assume that Descartes is referring here to properties of external bodies, but this reading is not fully convincing. In the section immediately preceding, Descartes did in fact argue that the retina takes on a shape because of the multi-colored light falling upon it.[12] The plainest way of interpreting the text is thus to have the different sorts of squares represented above reproducing different impressions on the retina, rather than different textures of the external bodies' surfaces. As a matter of fact, Descartes could well be speaking to both, implying that the retina takes on a chessboard-like shape because impressed by light rays reflected by a similar chessboard-like texture. By leaving aside for the time being the last point, what only matters for the present purposes is that for Descartes' theory of vision the retinal impression is nothing but a figure produced by a collision. As already shown, Descartes speaks indeed in this context of a *figura impressa*, with an obvious reference to the *species impressa* of the Scholastics.[13] The passage from a colored *species* to a bare *figure*, with everything it implies, could actually be taken as the key of Descartes' revolution in theory of perception. Descartes could thereby claim to have finally resolved Kepler's problem of a transmission of color-impressions "through the opacities of the body up to the inner cell of the soul" (*per opaca corporis ad Animæ penetralia*).[14] The key was to make colors too opaque,

[11] *Regulæ* XII; AT XII 413, 11-17; CSM I 41*: "Quid igitur sequetur incommodi, si, caventes ne aliquod novum ens inutiliter admittamus & temere fingamus, non negemus quidem de colore quidquid alijs placuerit, sed tantùm abstrahamus ab omni alio, quàm quod habeat figuræ naturam, & concipiamus diversitatem, quæ est inter album, cœruleum, rubrum, &c., veluti illam quæ est inter has aut similes figuras, &c.?". On the argumentative strategy of the *Rules*, see the *Appendix* to §26.

[12] And so for the other sense-organs. Cf. *Regulæ* XII; AT X 412, 26 - 413, 2; CSM I 40: "In the eye, the first opaque membrane receives the shape impressed upon it by multi-colored light; and in the ears, the nose and the tongue, the first membrane which is impervious to the passage of the object thus takes on a new shape from the sound, the smell and the flavor, respectively".

[13] Cf. *Ibid.* AT X 412, 26-28: "primum opacum, quod est in oculo, ita recipere figuram impressam ab illuminatione variis coloribus induta".

[14] On the importance of Kepler's theory of perception for Descartes' epistemology, see Raz Chen-Morris – Ofer Gal, "Baroque Optics and the Disappearance of the Observer: From Kepler's Optics to Descartes' Doubt", *Journal*

pattering the difference between blue and red after the difference between geometrical figures, transcribed from the retina to the brain thanks to the orderly motions of the nervous fibers. Schuster's recent claim according to which Descartes "was not yet fully aware of the deep epistemological puzzles latent in his mechanistic account of perception"[15] is therefore to be qualified: for how much some of the issues raised by this explanation of the perceptual process will challenge Descartes till his very last years, already at the time of the *Rules* Descartes has indeed realized what the issues at stake were, most of which had already been pointed out by Kepler (for a more articulated discussion of Schuster's interpretation of the *Rules*, see §26).

Descartes' pounding insistence on the issue of non-transparency (think of the *primum opacum*, that clearly echoes Kepler's *opacus paries, qui prius in oculo occurrit*) together with Descartes' very elaborated physiology of the nervous system prove moreover to disprove a quite standard narrative of the Early Modern understanding of sight, mainly due to Jonathan Crary. In his tremendously influential *Techniques of the Observer* (1990) Crary famously claimed that, by taking the *camera obscura* as a model, Descartes obliterated the "palpable opacity and carnal density of vision" to turn sight into a disembodied mental activity.[16] The mind, as an incorporeal witness of the *camera* machinery, would contemplate in a completely detached manner the figures of light projected onto the rear of the device, taking the cue from them for its own ruminations, out of which, by the pure force of geometry, the spatial properties of bodies would be calculated. What Crary and many after him have completely failed to understand is that the *camera obscura* worked for Early Modern thinkers as model for the *eye*, not for the visual process as a whole: "a cause que c'est l'âme qui voit, et non pas l'œil".[17]

The entire point of visual theories after Kepler's discovery – that is to say, after the *camera* model held sway – was precisely to explore the dark side of the perceptual process, figuring out what happened behind the "first opaque wall of the eye". In order to do so vision theorists had to give up their training as opticians, dealing with light and transparent media, to dirty their

of the History of Ideas 71 (2010): 191-217 and the revised version of the same essay in their *Baroque Science* (Chicago - London: University of Chicago Press 2013).

[15] *Ibid.* 319.

[16] Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: MIT Press 1990), 150. Crary's account had already been refuted for good on different grounds by Margaret Atherton, "How to Write the History of Vision: Understanding the Relationship between Berkeley and Descartes" in David M. Levin ed., *Sites of Vision: The Discursive Construction of Sight in the History of Philosophy* (Cambridge, MA: MIT Press 1999), 139-65. See also Catherine Wilson, "Discourses of Vision in Seventeenth-Century Metaphysics" in *Ibid.* 117-38.

[17] *Dioptrique* VI; AT VI 141 7-8.

hands like anatomists. Indeed, Kepler's transformation of *perspectiva* into the science of light – and of nothing but light – correspondingly prompts a new discipline to arise: the science of vision without light. The science of light and the science of sight (at least as far as the post-retinal stage of the process was at stake) had come to a parting of the ways.[18] As a result of it, and starting from Descartes' celebrated comparison of light rays with the sticks a blind man makes use of in order to navigate the world, the relation between vision and touch came to the fore as a major philosophical issue, which found its paradigmatic formulation in Molyneux's Problem. The science of vision without light went so far that Diderot, in his all-important *Lettre sur les aveugles à l'usage de ceux qui voient* (1747), argued that blind people had much to teach to the ones who see about how their vision works. The title chosen by Diderot, potentially so provocative and paradoxical, was yet, at that point of the debate, slightly more than a *mot élégant*, since it was already quite a while that the study of the visual process had been turned into a *leçons de ténèbres*.

Vision, pace Crary, did not get embodied for the first time at the beginning of the 19th century. Descartes cannot be taken, even in this case, as the perfect foil for an alleged breakthrough taking place some centuries later. At least in this occasion Descartes is more the father of what came after him than a foe.

[18] Although it should be noticed that still in the 17th and 18th centuries there were scholars (thing for example, in the Netherlands, of Lambert ten Kate) who dealt both with the light transmission and visual perception; cf. Fokko Jan Dijksterhuis, "Low Country Opticks: The optical pursuits of Lambert ten Kate and Daniel Fahrenheit in early Dutch 'Newtonianism" in Eric Jorink – Ad Maas eds., *Newton in the Netherlands* (Leiden: Leiden University Press 2012), 159-83.

§24.3. Internal sense organs

The story told so far about Descartes' account of the physiological stage of the perceptual process ended up in what has been generically referred to as "the brain". It is indeed in the brain that the nerves originate and on the brain that the retinal impressions are transcribed. Descartes, however, did not content himself with so unspecific a claim and tried his best to better spell out this theory, by pointing out which specific portion of the brain was impressed, and how exactly.

The *Rules* are indeed careful in distinguishing between *two* cerebral stages of the image transmission process:

> The common sense functions like a seal, fashioning in the phantasy or imagination, as in the wax, the same figures or ideas that come, pure and without body, from the external senses (*figuras vel ideas, à sensibus externis puras & sine corpore venientes*).[1]

As it can be noticed, the passage speaks promiscuously of *phantasia* and *imaginatio*. The relation between the two was notoriously problematic. Roger Bacon, for example, following Avicenna, located *imaginatio* in the rear surface of the first brain ventricle (the front one being of the common sense) whereas the *fantasia seu virtus fantastica* would have to do with the first ventricle in its entirety.[2] It was indeed debated whether the two faculties were to be distinguished in relation to the organ or merely in relation to their function, and the shifts in vocabulary in different authors makes even more difficult to outline a precise picture of the received views on the topic.[3] In the writing after the *Rules*, at any rate, Descartes tended to distinguish between the two, using *phantasia* to refer to an *organ* – i.e. to a "genuine part of the body" and, more specifically, of the brain – whilst *imaginatio* and its French pendant indicate for him a *faculty*: i.e. the power of the mind to imagine. As pointed out in §§5-8 of the first part of this work, in Descartes' view this *facultas imaginandi* is indeed nothing but the cognitive power – the *vis cognoscens* or, he also styles it, the intellect in the broad sense of the term – inasmuch as it applies itself to the organ of the *phantasia* and, hence, to the impressions traced thereupon, the so-called the *phantasmata* or "ideas", as Descartes refers to them in the writings of the 1620s and '30s. As made clear in §0, it is indeed only from the *Discours* onwards that Descartes will devote this term

[1] *Regulæ* XII; AT XII 414, 16-19; CSM I 41-42*.

[2] Bacon, *Perspectiva*, I 1, 2; Lindberg 5-9.

[3] For a survey of the main positions, see Harry A. Wolfson, "The Internal Senses in Latin, Arabic, and Hebrew Philosophical Texts", *Harvard Theological Review* 28 (1935): 69-133.

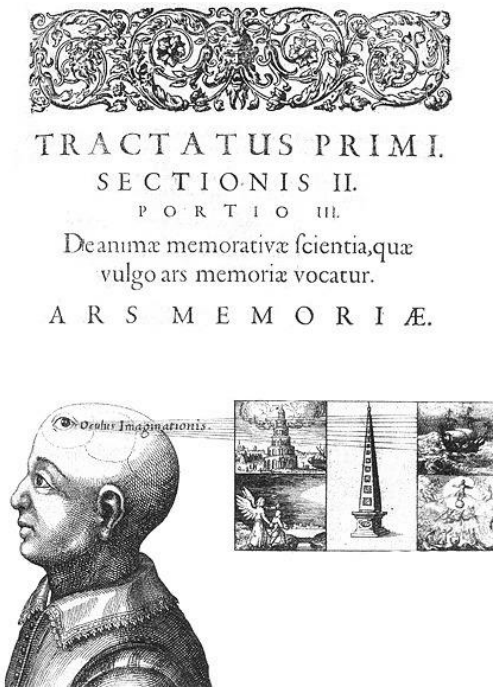
of art to the objects of consciousness, which in his view are of course non-corporeal, to qualify from then on as "corporeal" ideas the corresponding impressions on the brain – on the *phantasia*. The following of the chapter sticks to this lexical distinction and always refer by 'imagination' to the faculty and by *phantasia* to the corresponding organ, although it should be always kept in the mind that Descartes' usage of the term is not so systematic and that the *Rules* play a partial exception to this policy. As the passages just quoted show, according to the *Rules* the physiological part of the perceptual process takes place in three steps: the external sense organ, the "common sense" and the *phantasia*. The shape impressed on the appropriate membrane of the sense organ (such as the retina and the eardrum) is said to be transmitted to the common sense via the nerves, in the way described above. How the shape newly impressed on the common sense is transferred onto the *phantasia* remains, on the other hand, quite vague. In this case too, at any rate, Descartes thinks that no actual transmission of material items is required. The impressions are indeed said to arrive from the senses to the brain "pure and without a body", which of course cannot mean that the *phantasmata* themselves are non-corporeal, but only that they is no corporeal entity (not even the *phantasma* alone) creeping thought the nerves and then the ventricles.[4] This latter stage of the perceptual process seems to have simply been patterned after the one immediately preceding, although it is still far from clear what is supposed to do here the nerves' job.

Descartes himself was apparently dissatisfied with this part of the theory, which he reworked extensively in the years to come. Actually, the desire to come up with a better solution to this specific problem was almost surely among the main reasons that urged Descartes to devote himself to self-performed observations after abandoning the *Rules*. "I am now dissecting the heads of various animals, so that I can explain what imagination, memory, etc. consist in", this was Descartes' research program towards the end of 1632.[5] The anatomy of the *Rules* sounds in fact bookish, one more slight variation on Galen's theory of the brain ventricles. Although skeptical about its specifics and actual relevance for the cognitive process, Vesalius himself confessed he had no better explanation or, better, no explanation at all about how the brain performed its function. As a matter of fact, virtually all of Descartes' contemporaries were still adopting some versions of the ventricles theory. In Robert Fludd's 1619 *Ars memoriæ* (a book possibly known to Descartes) the ventricles model features not only in the text but in

[4] Cf. Jean-Marie Beyssade, "Le sens commun dans la *Règle XII*: le corporel & l'incorporel", *Revue de Métaphysique & de Morale* 4 (1991): 497-514.

[5] To Mersenne, November or December 1632; AT I 263; K 40.

the very front page.[6] Around Descartes' time it was still received wisdom to locate the common sense at the very beginning of the first ventricle and the *phantasia* somewhere behind (although quite often in this same cavity). The account of the *Regulæ* is perfectly consistent with this age-old model, which would also explain why Descartes presents no support for it.



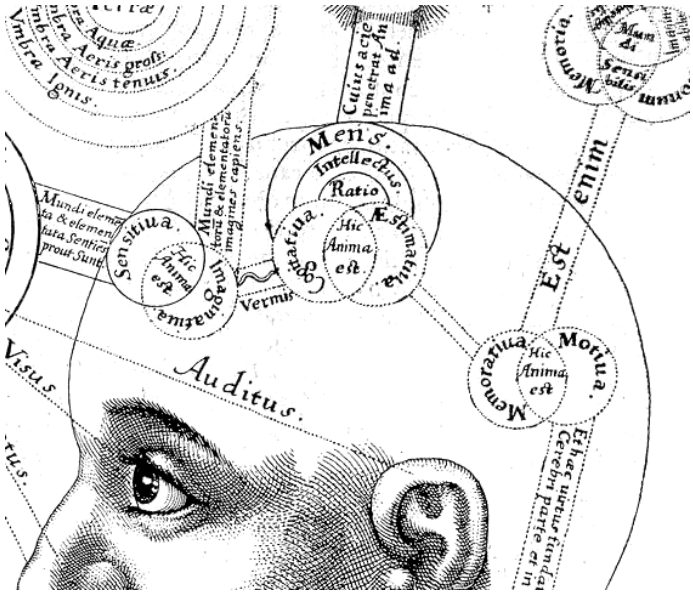


Fig. 14: Frontispiece of Robert Fludd, *Ars memoriæ* (Oppenheim 1619) in his *Utriusque Cosmi… Historia* II 302.

Fig. 15: Robert Fludd, *Utriusque Cosmi Historia* (detail).

It is indeed only after 1629 that Descartes started to speak of just *one* brain ventricle. The other two ventricles of the Galenic tradition did not disappear altogether, though, but were reinterpreted by Descartes as the front and the rear part of one and the same "cavity", in the middle of which sat the pineal gland.[7] The pineal gland ends up appropriating thereby the

[6] For Descartes' early remarks on mnemotechnic, see Paolo Rossi, *Clavis Universalis: Arti della memoria e logica combinatoria da Lullo a Leibniz* (Milano - Napoli: Ricciardi 1960). Fludd was, among the other things, a fervent supporter of the Brothers of the Rose Cross. At the time of his return to Paris in 1623 Descartes was accused by somebody (not better specified by Baillet) to be himself one of the so-called Rosicrucians, although apparently without much grounds. The issue is briefly addressed by Frances A. Yates, *The Rosicrucian Enlightenment* (London - New York: Routledge 1972), 151-55. Of the same author, on Fludd's mnemotechnic, see *The Art of Memory* (London: Routledge 1966).

[7] Descartes' *Traité de l'Homme* was published only posthumous, so that Descartes could not check the etchings illustrating the text. He had tried to sketch a few, but he himself complained his poor skills as a drawer (the few extant drawings of his hand make clear this was not an understatement; see AT XI 635). Therefore, one must be cautious in using the images of both Schuly's Latin and Clerselier's French edition. These have been compared – although not always very convincingly – by Claus Zittel, "Conflicting Pictures: Illustrating Descartes' *Traité de L'Homme*" in Sven Dupré – Christoph Lüthy eds., *Silent Messengers: The Circulation of Material Objects of Knowledge in the*

functions (as well as the names) of both the common-sense organ and the *phantasia*. Descartes, obviously enough, keeps on distinguishing between an activity of sensing, of imagining and of remembering (both on the physiological and on the phenomenological level), but he ceases to single out a ventricle of the brain for each of them.[8] Pursuing a line of reasoning already hinted at in the *Rules*, Descartes accounts now for them as different modes of acting of one and the same piece of matter: the pineal gland, namely. Descartes' problem after 1628 was thus no longer to transmit the impression on the retina to the common sense and thence to the *phantasia*, but to have it transferred from the *retina* to the *inner surface of the brain ventricle* and thence to the *outer surface of the pineal gland*.

Indeed, since in both the *Traité de l'Homme* and the *Dioptrique* Descartes identifies the organ of common sense and the organ of the imagination, it is difficult to maintain that the *Regulæ* have been written after 1633 (or at least after 1637, in case someone was to defend the claim that this piece of physiological theory belongs to a later reworking of the *Traité de l'Homme*). In the light of a different and abridged version of the text recently found in Cambridge by Richard Serjeanston (the so-called *Ur-Regulæ*), Daniel Garber and Theo Verbeek have suggested – completely independently of each other – that the text of the *Regulæ* we knew so far was written after the *Discours*. This dating has however been convincingly contested by David Rabouin, who argued that the evolution of Descartes' views on mathematics strongly suggest that the *Regulæ* were written before 1631.[9] Descartes' physiology too suggests sticking to the traditional dating, fixing 1632-1633 as the *terminus ante quem*.

Early Modern Low Countries (Berlin: Lit 2011), 217-60. On the role of illustrations in Descartes' scientific writings see Christoph Lüthy, "Where Logical Necessity Becomes Visual Persuasion: Descartes's Clear and Distinct Illustrations" in Sachiko Kusukawa – Ian Maclean eds., *Transmitting Knowledge: Words, Images, and Instruments in Early Modern Europe* (Oxford: Oxford University Press 2006), 97-134. The authorized image of the *Dioptrique* (AT VI 128 & 136) representing a section of a human brain is so imprecise that it does not permit to settle the question.

[8] Cf. *Homme*; AT XI 174, 8-10: "s'y forment les idées des objets, dans le lieu destiné pour l'imagination & pour le sens commun".

[9] See the forthcoming *Proceedings* of the conference "Descartes and *Ingenium*" (Cambridge, 14-15 March 2016).

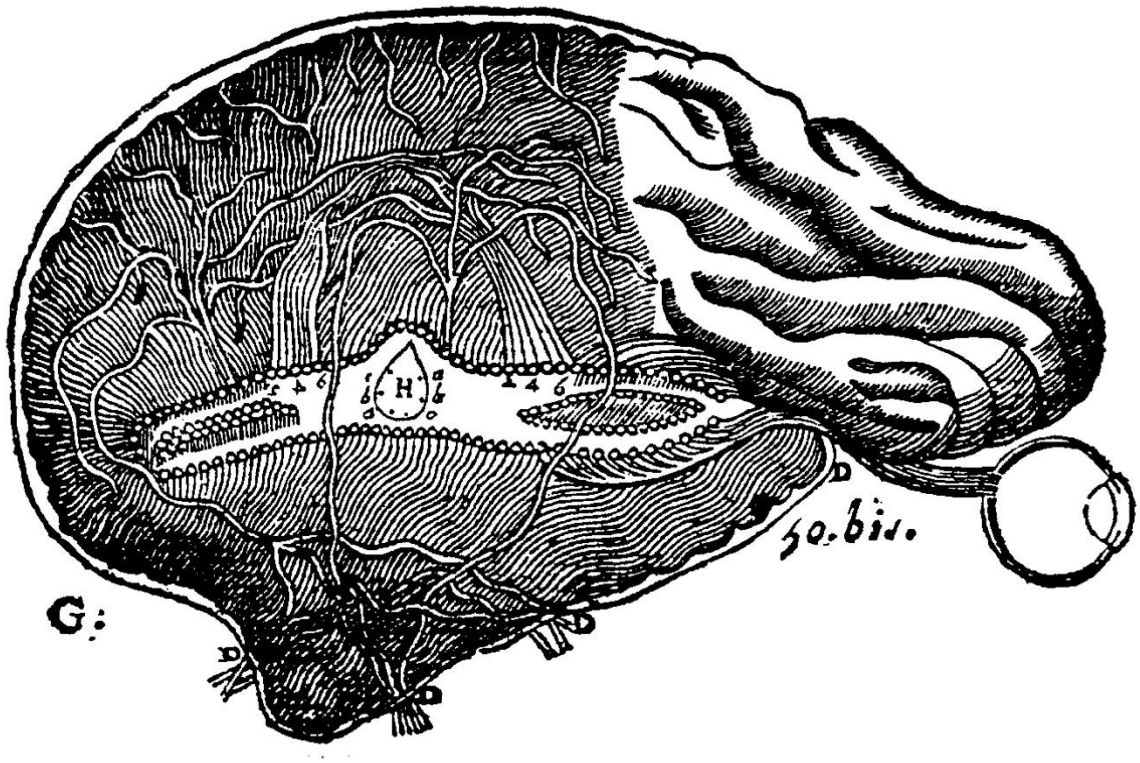


Fig. 16: The pineal gland and the single brain ventricle; *Traité de l'Homme*; AT XI 198, fig. XXXIX.

The transmission of the impression within the brain ventricle is arguably the most fabulous piece of Descartes' physiology. To solve this problem Descartes started looking around for something that could work exactly as the nerves: some sort of rods, rigid so that a movement at one of its ends would immediately result in a movement of the opposite one without any piece of matter having to travel between the two. He thought he had found it in the most refined particles of the blood, that the heart would pump in the aorta up to the pineal gland (which Descartes says to be porous). These particles are said to flow straight on from the gland, always because of the blood pressure, directed to the surrounding surface of the ventricle, where the nerves terminate. When one of these innermost ends of the nerves moves (set in motion by whatever is impinging on its outer extremity) the stream of particles issued by the gland moves correspondingly. It is indeed always crucial to keep in mind that the "image" on the gland Descartes speaks of is an image "composed by motions", as he writes, so that it would be more appropriate to describe it as a *pattern of motions* rather than as some image-like entities. As expressly pointed out by Descartes, the same applies also to the *peinture* on the retina:

> Par le mot de peinture, je n'entends autre chose que les divers mouvements des parties du cerveau 7 8 9;

comme aussi les peintures du fond de l'œil, des miroirs, etc. ne sont autre chose que tels mouvements.[10]

Not that some particles should travel from the gland to the nerve entrance. Descartes' account parallels here his theory of light, which he worked out in the very same years. Light rays, in Descartes' views, should not in fact be regarded as the path described by a light-particle (a photon, say; more on this in §26). Rather, the Sun, like all light sources, is said to exert a pressure on the round-shapes particles that constitute the skies, perfectly analogous to the pressure exerted by the gland on the blood particles within the brain ventricle.[11] Playing with this functional analogy, Descartes also speaks of the mind "radiating" (*rayonne*) from the pineal gland through the rest of the body by means of the animal spirits.[12] Descartes, obviously enough, does not maintain that there are rigid rods coming out of the Sun or of pineal gland. For Descartes, both the skies and the spirits are indeed fluids.[13] Yet, the streams of particles coming perpendicularly from the surface of the two behave exactly in that way, as Descartes' celebrated passages about the blind man in the *Traité* and the *Dioptrique* aim at making clear: the sticks the sightless man has in his hands are indeed intended to stand for the light rays. Something analogous takes place in the brain ventricle.[14]

Van Gutschoven and La Forge were thus perfectly right in representing the streams of blood particles as simple segments connecting points of the gland surface to point of the

[10] Cf. To Mersenne, 16 October 1639; AT II 591. Cf. *Dioptrique* VI; AT VI 130, 11-12: "les mouvements par lesquels elle [peinture] est composée". The point is made especially clear by La Forge in his *Remarques sur le Traité de l'Homme*: "les idées corporelles ne sont rien autre chose que la forme sous laquelle les Esprits sortent plus abondamment de quelques mailles de reseuil, ed de quelques pores de la glande, que les autre" – they are, this is, patterns of outflow; cf. *L'Homme, & un Traité de la formation du fœtus du mesme auteur avec les remarques de Louys de La Forge,* edited by Claude Clerselier (Paris: Le Gras 1664); reprint (Paris: Fayard 1999), 375. The physiological mechanism by which this impression is formed is carefully described by Jean-Marie Beyssade, "Réflex ou admiration: Sur les mécanismes sensori-moteurs selon Descartes" in Jean-Luc Marion ed., *La Passion de la Raison* (Paris: Presses Universitaires de France 1983), 113-30.

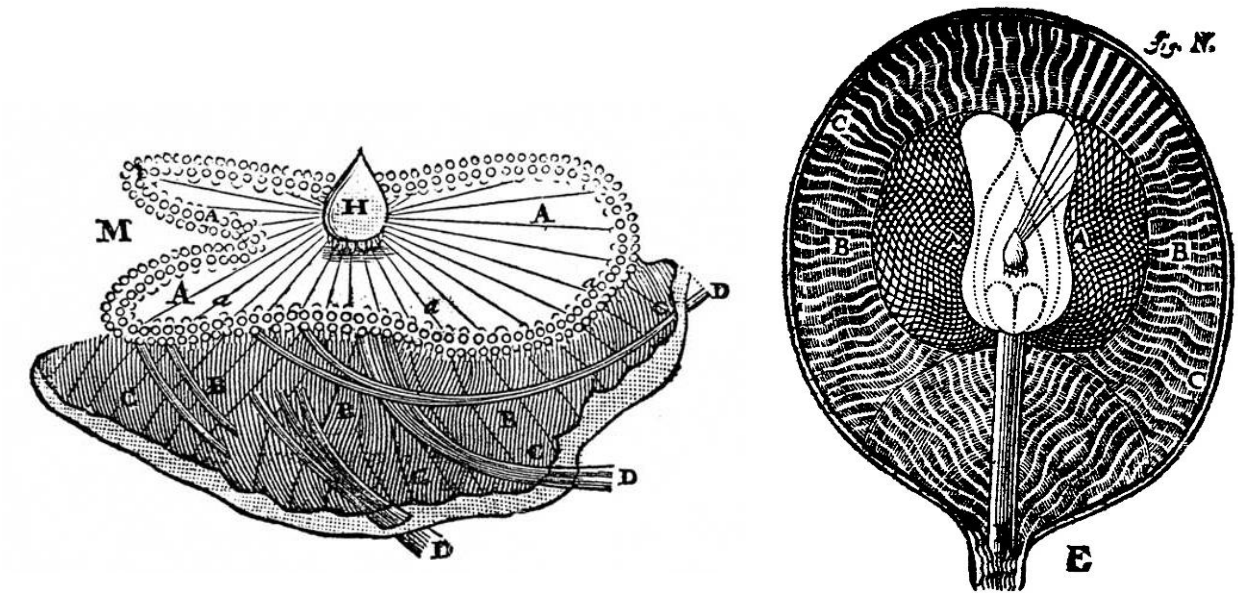
[11] As already pointed out by Des Chene, *Spirits and Clocks,* 128.

[12] Cf. *Passions* I 34; AT XI 354, 8-13. Descartes, therefore, is no longer committed with Kepler's or Harvey's (not so say Hobbes's) *metaphor* of the heart-Sun.

[13] That the skies are fluid is indeed a crucial claim of Descartes' physics, and a great part of the *Principia* is expressly intended to prove it. On the importance of hydromechanics for Descartes' physics, see Stephen Gaukroger, "The Foundational Role of Hydrostatics and Statics in Descartes' Natural Philosophy" in Stephen Gaukroger – John Schuster – John Sutton eds., *Descartes' Natural Philosophy* (London - New York: Routledge 2000), 60-80.

[14] Cf. *Homme*, 159, 9 - 163, 9. *Dioptrique* I; AT VI 84, 13-22; O 67. The matter is slightly more complicated in the physiological case, admittedly, as the system is also supposed to account for the *motion* of the animal, but the point might be left aside as long as anything but perception is at stake.

ventricle surface. As the theory presented so far should immediately make clear, finding out that these very refined particles of blood are nothing but the spirits has no implications whatsoever for the point at stake in this chapter. The sophisticated grid of lines depicted in the etchings of the *Traité de l'Homme* can in fact by no means be interpreted as a relapse into the Perspectivists' idea of color-transmitting spirits. Such a grid of lines is rather to be understood as one more instance of Descartes' intention to *géométriser à outrance* all natural phenomena, from the planetary vortices to the swarms of particles flowing from the gland.[15]



Figg. 17 & 18: The fluxes of spirits issued from the gland to the interior surface of the brain ventricle; *Traité de l'Homme*; AT XI 173-74 (figg. XXVI & XXVII).

[15] Following Koyré's famous expression; cf. Alexandre Koyré, *Études galiléennes* (Paris: Hermann 1939), II 32-33, 37. Schuyl, in a kindred spirit, spoke of the soul as a spider at the center of its web, from where it is ready to "rayonner facilement par tout"; cf. *L'Homme, & un Traité de la formation du fœtus du mesme auteur avec les remarques de Louys de La Forge,* edited by Claude Clerselier (Paris: Le Gras 1664); reprint (Paris: Fayard 1999), 418.

§25. "The institution of Nature": The mental stage of the perceptual process

Descartes maintained to have established, on purely philosophical grounds, that a sensory idea *does not must* be similar to the *material object* it is about. He also maintained to have established, thanks to his studies in physiology, that *as a matter of fact*, a sensory idea is *not* similar to the *physiological stimulus* which brings it about: color-experience according to Descartes is not in fact elicited by a coloring of the sense-organs, but by some patterns of motions transmitted "through the opacities of the body up to the inner cell of the soul". The latter claim raises right away an obvious question, though: how can a chessboard-like impression on the nervous fibers that form the retina present the perceiver with a sensation of blue? The *Rules* do not offer any explicit answer to this question, although Descartes appears to have been aware of the difficulty already at that point. In order to make sense thereof and of the related question whether the sensation is indeed similar to its object (namely, to the property of the body by which this sensation has been caused), Descartes appealed to the concept of an "institution of nature".

The notion – which seems to be of Descartes' coinage – makes it first appearance in the very first pages of *The World*, where Descartes contrasts "words, which signify nothing except by human convention" (*qui ne signifient rien que par l'institution des hommes*) with a different class of signs, which would have been "established (*établi*) by Nature".[1] As an example of signs of this latter kind, Descartes mentions "laughter and tears", which – so he claims – "Nature has established … to make us read joy and sadness on the faces of men".[2] By appealing to the case of signs – arbitrary as well as "natural" – Descartes wants to make clear at the very outset of his *Treatise on Light* that the notion of *representation* is to be divorced from the notion of *similarity*. Although "as everybody knows, words bear no resemblance to the things they signify", Descartes points out that by means of these words we come to know the things they stand for.[3] This model of representation without similarity, Descartes argues, *could* indeed apply also to the perceptual process. More in particular, Descartes wants to draw the attention of his reader to the fact that "there may be a difference" between (i) "the sensation we have of light, i.e. the idea of light which is formed in our imagination by the mediation of our eyes" and (ii) "what it is in the object that produces this sensation within us, i.e. what it is in the flame or the sun that we

[1] *Homme*; AT XI 4, 10-15; CSM I 81.

[2] *Ibid.* AT XI 4, 17-19.

[3] *Ibid.* AT XI 4, 3-5; CSM I 81*: "Vous savez bien que les paroles, n'ayant aucune ressemblance avec les choses qu'elles signifient, ne laissent pas de nous les faire concevoir".

call by the name «light»".[4] Although it is usually maintained that "the ideas we have in our mind are wholly similar to the objects from which they proceed", Descartes objects that there are no decisive reasons in favor of this claim, but only some arguments against. He refers in particular to the example (standard at the time) of "the idea of tickling and of pain", which clearly "bear no resemblance" to the bodies whose contact to the perceiver's own body makes these sensations arise. The opening chapter of *The World* where these remarks are to be found bears indeed the telling title "On the difference between our sensations (*sentiments*) and the things that produce them", and concludes with Descartes asking his reader to *leave open the possibility* that this might also be the case for the sensation of light:

> I have not brought up these examples to make you believe categorically that the light in the objects is something difference from what it is in our eyes. I merely wanted you to suspect (*doutiez*) that there might be a difference, so as to keep you from assuming the opposite.[5]

In the writings of the following years Descartes came back to the problem of whether the different stages of the perceptual process are linked by a relation of similarity as argued by Aristotelians. Descartes reworked accordingly the opening remarks of *The World* and spelled out the concept of an "institution of nature", only intimated by the treatise of 1633. As already pointed out in §0, from at least the time of the *Essais* (1637) Descartes reserved the term "idea" to mental states only, and ceased therefore to speak of "l'idée qui s'en forme en notre imagination par l'entremise de nos yeux". The most important shift as far as the notion of a "natural institution" is concerned pertains however to the *terms* between which this relation is said to hold. If in 1633 the two *relata* were in fact the sentiment/idea and the external object, from the late 1630s to the end of his life Descartes will speak of a "natural institution" between brain and mental states. Many pieces of evidence could be put forward, but even a partial selection is enough to give a sense of the pervasiveness of the concept of a "natural institution" in Descartes' mature philosophy, from the 1637 *Dioptrique* to the 1649 *Passions of the Soul*:

[4] *Ibid.* AT XI 3, 1-8; CSM I 81: "Me proposant de traiter ici de la lumière, la première chose dont je veux vous avertir, est, qu'il peut y avoir de la différence entre le sentiment que nous en avons, c'est-à-dire l'idée qui s'en forme en notre imagination par l'entremise de nos yeux, & ce qui est dans les objets qui produit en nous ce sentiment, c'est-à-dire ce qui est dans la flamme ou dans le Soleil, qui s'appelle du nom de lumière".

[5] *Ibid.* AT XI 6, 22-27; CSM I 82.

> The movements of which the picture [the brain impression; see above §24.3] is composed, which act immediately on our mind inasmuch as is united to our body, are so established by nature as to make it have such perceptions (*sont institués de la nature pour lui faire avoir de tels sentiments*).[6]

> When the nerves are pulled in the foot, they in turn pull on inner parts of the brain to which they are attached, and produce a certain sensation in them. And nature has laid it down that this motion should produce in the mind a sensation of pain as occurring in the foot (*qui institutus est a natura ut mentem afficiat sensu doloris tanquam in pede existentis*).[7]

> For merely by entering into these pores, the spirits produce in the gland a particular movement which is instituted by nature to make the soul feel this passion (*un mouvement particulier en cette glande, lequel est institué de la nature pour faire sentir à l'âme cette passion*).[8]

In Descartes' Latin writings the concept of an "institution of nature" is less frequent (although the passage quoted above from the *Meditations* is not a *hapax*: another decisive text from the *Sixth Meditation* is analyzed in detail in what follows). The concept of an "institution of nature" is however unquestionably at work also in the 1644 *Principles*, and easily recognizable even in the absence of the name:

> *The nature of the mind is such that various sensations can be produced in it simply by motions in the body.*
> It can also be proven that the nature of our mind is such that the mere occurrence of certain motion in the body can stimulate it to have all manners of thought which have no likeness to the movements in question… We clearly see that the sensation of pain is excited in us mere by the local motion of some parts of our body in contact with another body; so we may conclude that the nature of our mind is such that it can be subjected to all the other sensations merely as a result of other local motions.[9]

For Descartes the specific "institutions" to bring about certain sensations, which would be how many as the types of brain states, are indeed to be understood as instances of *one* superordinate institution: the institution *of the mind* to react to certain stimuli in a certain way. At the bottom

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[6] *Dioptrique* VI; AT VI 130, 11 - 131, 1; O 101* (emphasis added).

[7] *Meditationes* VI; AT VII 87, 5-11; CSM II 60.

[8] *Passions* I 36; AT XI 357, 4-7; CSM I 342*. See also *Passions* II 89; AT XI 394; CSM I 359: "l'horreur est instituée de la nature pour représenter à l'âme une mort subite & inopinée". *Ibid.* II 90; AT XI 395; CSM I 360: "l'agrément est particulièrement institué de la nature pour représenter la jouissance de ce qui agrée comme le plus grand de tous les biens qui appartiennent à l'homme" (along very similar lines see already *Passions* II 20). Cf. *Passions* II 94-95; AT XI 399-400; CSM I 361-62. *Ibid.* II 137; AT XI 429-30; CSM I 376.

[9] *Principia* IV 192; AT VIII-1 320, 23 - 321, 23; CSM I 284*.

level, for Descartes it is not so much that the manifold physiological stimuli are instituted as to give rise to certain sensations in the mind, but is rather the mind to be instituted in such a way as to have like-and-like a sensation in response to like-and-like a stimulus from the body. That calling this or not an "institution de la nature" had more to do with the change of language than with a change of mind is made crystal-clear by a comparison between another proposition of the 1644 *Principia* (always from the end of the *Fourth Book*) with its French pendant:

> Ita imaginatio fruitionis alicujus boni, non ipsa sensum laetitiae in se habet, sed spiritus ex cerebro ad musculos, quibus illi nervi inserti sunt, mittit, eorumque ope orificia cordis expanduntur, *et ejus nervuli moventur eo motu, ex quo sequi debet ille sensus*… Eadem ratione sanguis nimis crassus, maligne in cordis ventriculos fluens, et non satis ibi se dilatans, alium quendam *motum* in iisdem praecordiorum nervulis facit, *qui cerebro communicatus sensum tristitiae ponit in mente*.[10]

The French authorized translation of the same passage reads in fact:

> Ainsi, lorsque nous pensons jouir de quelque bien, l'imagination de cette jouissance ne contient pas en soi le sentiment de la joie, mais elle fait que les esprits animaux passent du cerveau dans les muscles auxquels ces nerfs sont insérés; et faisant par ce moyen que les entrées du cœur se dilatent, elle fait aussi que *ces nerfs se meuvent en la façon qui est instituée de la nature pour donner le sentiment de la joie*... Tout de même, lorsque le sang est si grossier qu'il ne coule et ne se dilate qu'à peine dans le cœur, il excite dans les mêmes nerfs *un mouvement* tout autre que le précédent, et *qui est institué de la nature pour donner à l'âme le sentiment de la tristesse*.[11]

The concept of an "institution of nature" is indeed to be regarded as a *Leitfaden* of Descartes' mature theory of perception. As a matter of fact, already at the time of the *Rules* Descartes started to challenge the Perspectivists' thesis that color-perceptions are brought about by a coloring of the sense-organs. As shown in §24.2, in the *Twelfth Rule* Descartes argued indeed that one could conceive of "the difference between white, blue, red, etc. as being like the difference between the following figures, or similar ones" impressed on the retina (see the image immediately below). There are undeniably some all-important differences between the *Rules* and

[10] *Principia* IV 190; AT VIII-1 317, 3-20.

[11] AT IX-2 311. It is to be noticed, however, that even in the Latin text Descartes comes at one point pretty close to make an explicit reference to his theory of an "institution of nature", writing that "sanguis rite temperatus, facile ac plus solito in corde se dilatans, nervulos circa orificia sparsos ita laxat & movet, ut inde alius motus in cerebo sequatur, qui *naturali quodam sensu hilaritatis afficit mentem*: ac etiam aliae quævis causae, nervulos istos eodem modo moventes, eundem illum laetitiae sensum dant" (*Principia* IV 190; AT VIII-1 316, 26 - 317, 3).

Descartes' later accounts. First, as already pointed out, in the *Rules* the concept of an "institution" governing the relation between brain and mental state is never mentioned. Secondly, in the *Rules* Descartes simply *intimates* that the relation between the two domains described is of this kind (on the rhetorical and argumentative strategy of this text see the *Appendix* to the next chapter). The *Rules*, furthermore, only *claim* that the phenomenological differences between colors could be *modelled* after differences in shape of the retinal-impressions, whereas in the following writings Descartes intended to show thanks to his natural philosophy that they had to, insofar as nothing but patterns of motions impress the retina and are transmitted by the nerves to the brain. This all being said, "the institution of nature" is clearly to be understood as Descartes' mature attempt to spell out more fully what is the *Rules* remains a mere adverb, *veluti*, according to which the differences between color-sensations would be "just like" the differences between the corresponding retinal impressions. The "institution of nature" of Descartes' writings of the 1630s and '40s is indeed to be construed as the *relation* ruling the pairing of retinal-impressions and color-sensations, which might be expressed as an arrow linking the two sets.

But what kind of problems did Descartes intend to solve by introducing the notion of an "institution of nature"?

Most interpreters have claimed that Descartes' overriding concern in working out the theory of an "institution of nature" was to account for the *causal relation* between body and mind once they are understood not only as independent, but also as completely heterogeneous substances (extended the former, indivisible the latter, just to name the most striking opposition between the two). Yolton, for example, argued that the reason why Descartes accounted for the relation between brain and mental states in terms of a semiotic relation was because his dualism ruled out any causal account: "causation could no work across categories", Yolton claims.[12] Some other interpreters, like Broughton, connected this issue to the alleged radical innatism of the 1648 *Notes on a Certain Broadsheet* and claimed that Descartes came to endorse this theory as he could not "take sensory states of the mind to be caused by bodily motions which differ in nature from these states".[13] All these readings subscribe to some form of Cottingham's "causal likeness principle", sometimes to the point of speaking of the causal interaction between

[12] John W. Yolton, *Perceptual Acquaintance: From Descartes to Reid* (Oxford: Blackwell 1984), 22.

[13] Janet Broughton, "Adequate Causes and Natural Change in Descartes' Philosophy" in Alan Donagan – Anthony N. Perovich – Michael V. Wedin eds., *Human Nature and Natural Knowledge: Essays Presented to Marjorie Grene on the Occasions of Her Seventy-Fifth Birthday* (Dordrecht: Reidel 1986): 107-27, see especially 115-19. I have already argued against this reading of the *Notes* in §4, to which the reader is referred.

dissimilar entities as a plain "scandal", which would give rise to what Richardson called Descartes' "Heterogeneity Problem".[14] It would be precisely this problem, claimed another authoritative scholar, that led Descartes to embrace a variant of occasionalism, since the *influx* model of efficient causation defended in the seventeenth century (so claims Nadler) required substantial likeness between cause and effect.[15] §16 has however already pointed out that Descartes did not see any difficulty in a genuine causal interaction between non-similar substances. He rejected in fact Gassendi's claim to the contrary protesting that all objections along these lines "proceed from a supposition that is false and that cannot be proved: namely, that if body and soul are two substances with different natures, that prevents them from being able to act on one another".[16] As the passage makes crystal-clear, dissimilarity is for Descartes no impediment to causation. The claim that the "institution of nature" was introduced by Descartes as an *Ersatz* for causation cannot therefore be grounded on the "causal likeness principle". No like principle is indeed to be found in Descartes.

How body-mind causation works for Descartes is admittedly a thorny interpretative problem. Some like Loeb claimed that Descartes subscribed to a form of associationism, according to which between physical and mental states there would be a "mere brute conjunction".[17] Others, like Schmaltz, have at the opposite put much emphasis on a passage of the *Conversation with Burman* and tried to account for the issue in terms of a psycho-physiological law, the equivalent for body-mind interaction of the laws of nature by which Descartes intended to explain the interaction between bodies.[18] The issue is especially tricky since other interpreters

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[14] Robert Richardson, "The "Scandal" of Cartesian Interactionism", *Mind* 91 (1982): 20-37.

[15] Steven Nadler, "Descartes and Occasional Causation", *British Journal for the History of Philosophy* 2 (1994): 35-54. The only passages quoted by Nadler in support of his view are the same used by Cottingham to show Descartes' (purported) commitment to the "causal likeness" principle, which Nadler too interprets along Cottingham's lines. I already argued against these reading of Descartes' texts in §16.

[16] Letter to Clerselier, January 12, 1646, AT IX-1 213, CSM II 275.

[17] Louis E. Loeb, *From Descartes to Hume*: *Continental Metaphysics and the Development of Modern Philosophy* (Ithaca, NY: Cornell University Press 1981), 137. As pointed out among the others by Wilson, Loeb's interpretation does not however seem to be supported by the texts; cf. Margaret D. Wilson, "Descartes on the Origin of Sensation", *Philosophical Topics* 19/1 (1991): 293-323.

[18] Cf. *Conversation with Burman* (16 April 1648); AT V 163-64; K 346, on which Tad M. Schmaltz put much emphasis in his *Descartes on Causation* (Oxford: Oxford University Press 2008). Since the *Conversation* is not a text of Descartes' hand, one should of course be really careful in making use of it. Most of Schmaltz's interpretation is at any rate largely independent of whether the institution on nature is or is not understood in terms of a psychophysiological *law*. In his study, Schmaltz convincingly challenged any "Occasionalist" reading of Descartes as far as body-mind causation is concerned (even in the mitigated version defended by Nadler), arguing that for Descartes "occasional

argued for a more or less strong evolution in Descartes' view on the topic (usually arguing for an evolution from plain interactionism to an occasionalism of sorts), and pointed out that in the body-mind causation Descartes seems to ascribe to the body a more robust causal role than he does in the body-to-body case.[19]

In a very insightful paper, Marleen Rozemond convincingly argued that the real problem Descartes thought he had to face in his theory of perception (sense-perception being the chief instance of body-mind causation) was not however the "Heterogeneity Problem", but rather what she calls the "Dissimilarity Problem". Rozemond showed that by his theory of an "institution of nature" Descartes did not intend "to offer an alternative to causation, but a model of causation that is compatible with the lack of resemblance, the seemingly arbitrary relation between the sensation and the corresponding brain motion".[20] According to Rozemond, Descartes ascribed to the mind a genuine causal power, and he had indeed to (claims Rozemond) if he was to explain the production of sensations so dissimilar from the corresponding brain states.[21]

The problem of body-mind causation in Descartes would definitely deserve a study of its own, and the mere amount of interpretations just mentioned should suffice to give a sense of the sophistication of the debate on the issue. As far as the topic of the present work is concerned, these problems – albeit important – might and should nonetheless be left aside. If for simplicity's sake throughout the chapter and the rest of this work a plain causation talk is

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connection between motions and sensations is grounded in divinely instituted *natures*". According to Schmaltz for Descartes both the mind and the body do indeed carry out a causal work, ant this also as far as Descartes' late writings are concerned; cf. *Descartes on Causation* 157: "On my interpretation, the final position in the *Comments* is that brain motions are real efficient causes of sensory ideas, albeit causes supplemented by the activity of the innate mental faculty" (whereas according to Nadler motions only "induce" the innate faculty of the mind to be the efficient cause of ideas).

[19] Garber's account of Descartes' view on body-mind causation has already been analyzed in §2.

[20] Marleen Rozemond, "Descartes on Mind-Body Interaction: What's the Problem?", *Journal of the History of Philosophy* 37 (1999), 460. *Ibid.* 461: "It is not the case that the problem arises because Descartes assumes that cause and effect must resemble each other. Rather it arises because, as a result of the particular types of dissimilarity of brain state and idea… their connection seems arbitrary and the brain state by itself can't account for the idea".

[21] Rozemond, "Descartes on Mind-Body Interaction" 466: "Descartes does not think of causation in terms of simple correlations but genuine causal powers" and 461-62: "He wanted a genuine causal explanation in terms of causal powers for the seemingly arbitrary correlation between sensory ideas and the corresponding bodily states. A brain state does not have the causal power to explain the occurrence of a corresponding idea, and so it can't be the entire cause. A further causal power must be in play. A mere association would leave the occurrence of the idea unexplained".

adopted, the reader should be aware that none of the arguments presented hinges thereon: the theses that are going to be defended – as well as the ones which have already been defended – are indeed independent from the specific theory of causation ascribed to Descartes.

Although considering the theory of the "institution of nature" with the intention to better figure out Descartes' causation model, Rozemond correctly pointed out that according to Descartes the really crucial problem was the *dissimilarity* between the brain state and the corresponding sensation. If this dissimilarity has important bearings on the concept of cause, its implications for the theory of perception cannot be possibly overrated. It seems indeed legitimate to claim (and what follows presents evidence for this reading) that Descartes' main intention in advancing the theory of an "institution of nature" was not to supply an alternative model of causation compatible with dualism. By means of this concept Descartes meant first of all to make sense of the perceptual process and, more in detail, to account for the relation between brain and mental states (between impressions on the pineal gland and ideas) with the intention to determine whether it was in fact necessary to posit in bodies anything more than extension and its modes. According to Descartes, the most important metaphysical consequences of the doctrine of an "institution of nature" did not have to do with how a body can bring about a change, but with what a body truly *is* – whether nothing but an extended thing or an extended thing to which real accidents such as "redness", "whiteness" and all other sensory qualities are attached. More than with Suárez's understanding of the *phantasma* as an *occasio excitans*,[22] Descartes' theory that the impression on the sense-organs is "instituted by nature" to bring about a certain idea is indeed to be understood as a reaction to Rubio's claim that the *species* is *naturaliter ordinata* to bring about a certain sensation. Not only to Rubio's, but to the entire assimilation model of perception that both the Perspectivists and Rubio and all Aristotelians had been defending for centuries, for how much they could disagree over the details. It makes therefore perfect sense that the first of Descartes' writings where a full-fledged formulation on the concept of an "institution of nature" is to be found is the *Dioptrique*.

As already seen, Descartes agreed with the Perspectivists that light and color are apprehended "by naked sense" – that is, merely as a result of a physical alteration of the sense-organs, rather than through an inference, or some kindred cognitive operation.[23] He agreed,

[22] Suárez, *De Anima* I.11 §21; *Opera* 3:550; quoted and discussed in Schmaltz, *Descartes on Causation* 147-48.

[23] Descartes insists indeed that brain movements immediately result in perceiving of light and color, without any cognitive processing of this information. For Descartes (*pace* Yolton) the "signs of nature" are not in fact to be somehow "interpreted", or their meaning "learnt": the difference between arbitrary and natural signs consists indeed precisely in the fact that the passage from the *significans* to the *significatum* unfolds in the latter case "naturally"

moreover, that since the proper sensibles of sight are two, the visual apparatus (the eyes, namely, and the pineal gland – Descartes' own version of the *ultimum sentiens*) must undergo *two* distinct, although possibly related, physical alterations. Descartes, however, thought that the empirical researches of this time has proven that it cannot be that a perceiver "apprehends light because the common nerve gets illuminated, as it apprehends color because the common nerve gets colored":[24] the only alterations admitted by Descartes' physiology are indeed alterations of organs' shape induced by motions. It is precisely at this point that the doctrine of "institution of nature" comes in. Opposing the claim that we perceive colors because the picture "formed on the back of the eye and… transmitted into our head" is colored, in the *Dioptrics* Descartes affirms in fact that (completing a passage already mentioned a few pages before):

> it is the movements of which the picture is composed which, acting immediately on our mind inasmuch as is united to our body, are so established by nature as to make it have such perceptions (*sont institués de la nature pour lui faire avoir de tels sentiments*)… Regarding light and color, which alone properly belong to the sense of sight, it is necessary to think that the nature of our mind is such that the *force* of the movements in the areas of the brain where the small fibers of the optic nerves originate cause it to perceive light, and that the *character* of these movements cause it to have the perception of color.[25]

– i.e. simply as a result of the nature of the mind. As Descartes made as clear as possible while distinguishing between the three already-mentioned stages of the visual process: "The second stage comprises *what immediately results in the mind* because of its being united with a bodily organ which is affected in this way. These are the sensations of pain, pleasure, thirst, hunger, color, sound, taste, smell, heat, cold and the like, which arises from the union and as it were the intermingling of mind and body… This second stage only extends to the perception of the color and light reflected from the stick; it arises from the fact that the mind is so intimately conjoined with the body that it is affected by the movements occurring in it"; *Responsiones* VI; AT VII 436, 26 - 437, 11; CSM II 294-95*. Perceiving a certain color as a result of a certain retinal and hence cerebral impression is indeed for Descartes a basic fact of how the human embodied mind is constituted. Only in case this nature had a different constitution it would accordingly be possible to have different sense-perceptions as a result of the same brain-impressions, whereas Yolton's account would make room for a plurality of possible interpretations of the same sense-impressions while leaving unaltered the mind's nature. According to Descartes, however, there is no choice to be made or cognitive activity to be performed in this case: not perceiving red as a result of a certain brain-stimulus would simply mean that this being is not a human being (more on this below).

[24] From the already quoted Witelo, *Opticæ thesaurus* III 22, 95.

[25] *Dioptrique* VI; AT VI 130, 11 - 131, 1; O 101* (emphasis added). In the *Treatise on Man* and in the *Dioptrics* Descartes argues that distance too is sometimes perceived merely as a result of a physiological alteration, and the the same holds true for position. The lists of the visibles perceived "by nakes sense" should accordingly be extended to features that for the Perspectivists required a cognitive activity of some sort to be appreciated. Descartes, accordingly, speaks of an "institution of nature" also for position and distance-perception. See for example *Dioptrique* VI 134, 22 - 135, 7 & 137, 5-15; O 105-106: "The seeing of distance depends no more than does the

The same according to Descartes holds true *mutatis mutandis* for the ideas of *all* the senses, both internal and external ones, all solicited by a stimulation coming to the brain from the pertinent nerves:

> Analogously, the movements of the nerves which respond to the ears cause it [the mind] to hear sounds, and those of the nerves of the tongue cause it to taste flavors, and, generally, those of the nerves of the entire body cause it to feel some tickling, when it is the movements of which the picture is composed which, acting immediately on our mind inasmuch they are moderate, and when they are too violent, some pain. In all this, though, there need be no resemblance between the ideas that the mind conceives and the movements which cause these ideas.[26]

Contrary to what is sometimes argued (as for example by Alquié), it is however crucial not to confuse Descartes' doctrine of an institution of nature with Johannes Müller's theory of *spezifische Sinnesenergien*.[27] Müller's starting point is indeed the same as Descartes': one and the same cause – electricity, in the case of Müller; motion in Descartes' – affects all sensory-organs and, yet, these stimulations result in sensations as different as colors and sounds. According to Müller these phenomenal differences cannot however be explained by appealing to the specific range of stimuli different sense-organs are responsive to, since all stimuli are, at the bottom level, of one and the same nature (all being electrical), whereas the resulting sensations differ in kind (as colors and sounds do). Descartes would have agreed with this claim: according to his physiology the retina and the eardrum are indeed responsive to motions of different sorts. Still, they both are reactive to nothing but motion. In order to account for the qualitative character of experience, Müller proposed thus that every class of sensory-nerves (optical, auditory and so forth) had its own "energy": pressing the eye would accordingly elicit sensations of flashes of light because of the specific nature of the optical nerves, and analogously for the other classes of nerves. From Descartes' point of view, Müller could thus be taken to propose that the passage from the physiological to the mental stage of the process takes place already in the nerves (rather

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seeing of location upon any images emitted from objects; but in the first place upon the shape of the body of the eye. For as we have said, for us to see that which is close to our eyes, and to see what is farther away, this shape has to be slightly different. And as we change it in order to adjust the eye to the distance of objects, we also change a certain part of our brain, in a way that is established by nature to allow our mind to perceive that distance". Although of extraordinary importance for the history of vision theory, this point of Descartes' psychology is irrelevant for the issue at stake. The matter will be touched on in §27, which will also discuss the tension between these claims and the analysis of the perceptual process presented in the *Meditations*.

[26] *Ibid.* AT VI 131, 1-10; O 101.

[27] As maintained for example by Ferdinand Alquié in Descartes, *Oeuvres philosophiques* I 700-701.

than in the brain), so that each class of sensory nerves would have its own specific "institution". In refuting the Perspectivists' Scheme, Descartes was however crystal-clear that "we observe no differences between the various nerves which would support the view that different nerves allow different things to reach the brain from the external sense organs, *or that anything reaches the brain except for the local motion of the nerves themselves*".[28] According to Descartes, the patterns of motions impinging on the retina, or on the eardrum, remain therefore patterns of motions all their way to the pineal gland, which Descartes argues to be the only portion of the body to which the mind is *immediately* united and, accordingly, the only organ where the passage from the physiological to the mental stage of the perceptual process can occur. The "institution of nature", accordingly, can only make a claim about *brain motions*.

Contrary to Müller, Descartes had therefore at his disposal a very limited set of variables in order to distinguish *within the brain ventricle*, where all sensory stimuli converge, between the motions coming from the optical and the motions coming from auditory nerves. It is indeed only in the light of these differences that for Descartes the mind, via the institution of nature, is presented with a color or, alternatively, with a sound. Were the motions coming from different nerves mixed up, so would be the resulting experience. Descartes had therefore to spell out for all sense-modalities some features comparable to the *force* and *façon* by which the motions coming from the optical nerves are said to bring about the sensation of light, respectively, and of color. Descartes, unfortunately, does not say much about the issue. An easy way out would be to postulate that the fibers of different classes of nerves move in different ways, a difference which cause correspondingly different outflows of the spirits issued from the gland in direction of the surrounding surface of the ventricle where the nerves terminate. The spirits issued from *b* towards 4 would accordingly move in a different way than the spirits flowing from the same point towards 8, thereby ensuring a different brain stimulation which would result in different sense-perceptions (see fig. 9 above). Descartes' general approach to the issue seems nonetheless to suggest a different solution. In a few passages the term "idea" (in the corporeal sense of the term, meaning the physiological stimulus that bring about a sensation – the idea in the proper sense) is in fact used by Descartes to refer not to the impression on the gland as such, but to *the impression on the gland in relation to the brain ventricle*. According to Descartes the pineal gland does indeed lean forth- or backwards: its position plays as a matter of fact a crucial role in distance perception.[29] Moreover, the patterns of motions flowing from the gland Descartes speaks of are always directed towards some specific portion of the brain ventricle's surface where a certain

[28] *Principia* IV 198; AT VIII-1 321, 24-28; CSM I 284 (emphasis added).

[29] On the "idea of distance", see *Homme*; AT XI 183, 5-16; Hall 94.

class of nerves terminate. Properly speaking, the impression on the gland cannot therefore be treated as an image under any regard, not even as a picture "made up of motions", as Descartes sometimes writes "in order to depart as little as possible from currently accepted beliefs".[30] A pattern of motions can in fact be defined only if the direction of all the motions that constitute it is defined, and in order to do so one must of course move beyond the pineal gland taken in isolation to take into account the overall dynamic system of which the gland is only a part, even though the most important one. It is indeed only inasmuch as the pineal gland is responsive to what is going on in the entire body (via the nerves) and, more specifically, in the brain ventricle in the middle of which is seated, that the mind (by being immediately united with it) happens to be joined with the entire body. There is thus no need for the motion directed from *b* towards 4 to be somehow distinct (in speed, for example) from the motion moving from *b* towards 8: the difference in direction between the two might suffice to tell them apart. This is indeed the account sketched in a private annotation of which virtually anything is known (neither the time of composition, nor its intended destination), that we know only thought Leibniz's manuscripts:

> The difference between sensations is not only to be sought in a difference between [kinds of] impacts, but mainly in the fact there are manifold routes bringing them to the mind (*sensuum diversitas non tantùm ex tactuum diversitate petenda est, sed maximè ex eo quòd diversis vijs deferant ad mentem*).[31]

For Descartes, to account for the difference between sensations there is therefore no need to appeal to some alleged "specific energy" of the different nerves. Descartes does claim that "the wide variety in sensations is firstly a result of the differences in the nerves themselves",[32] but the differences he has in mind are only the different locations of the nerves' extremities on the brain ventricle surface, not an alleged specific sensitivity peculiar to the different classes thereof. Rather than speaking of an impression on the glad, the concept that better captures the complexity of Descartes' concept of a corporeal idea appears therefore to be the concept of a *brain state*, which in what follows will therefore be used as a synonym – or, better, as an explanation – of "idea" in the corporeal sense of the term (accordingly, the idea in the proper sense of the term is also referred to as the "mental state").

Why however did Descartes linger so much on these details? And why should we waste our

[30] *Dioptrique* IV; AT VI 112, 28-29; O 89.

[31] *Excerpta varia*; AT XI 652.

[32] *Principia* IV 190; AT VIII-1 316, 12-14; CSM I 280. The passage continues: "and, secondly, of differences in the sorts of motions which occur in particular nerves".

time on a physiology that had already been disproven shortly after Descartes' death? The specific of Descartes' solution – where he thought the pineal gland to be located, for example – are as a matter of fact largely irrelevant for the issue at stake. What really matters, though, is to understand that the chief concern of Descartes' physiology was to make sure that the differences between patterns of motion at the level of the sense-organs could be transmitted to the brain without any loss or distortion of any pieces of information, by orderly integrating the stimuli coming from the same object through different sense-organs. Only in case these conditions are achieved Descartes thought that the content of sense-experience could indeed preserve all the manifold *differences* between the manifold physiological stimuli. The *differences* between the stimuli, not the stimuli as such, individually taken. Descartes (as shown in the previous chapters, especially in §24) thought in fact that the brain impression is only residually similar to the retinal impression, and insisted repeatedly that it is not by virtue of this partial similarity that the former "represents" the latter.[33] By means of the arguments presented in *The World* and rephrased in virtually all his following writings, Descartes intended in fact to make clear that representation is a more abstract relation than similarity and there are indeed cases (language being the best case in point) were the *repræsentans* clearly bears no resemblance to the *repræsentatum*: whereas all similarity relations are *eo ipso* also representations – representations by similarity – the contrary does not in fact hold true.

The language analogy should not however be pushed too far. According to Descartes ideas (sensory ideas included) have in fact an *intrinsic intentional structure*, which is missing in the case of words: whereas it is only by convention that certain phonemes and graphemes are employed by a certain linguistic community to represent, according to Descartes it is in the very essence of ideas to be mental *representations*, to be ideas *of* something. According to Descartes ideas are not to be "interpreted": their "aboutness" is built right from the beginning in their noetic structure. The *objective reality* of an idea is not indeed to be construed as the *meaning* of a mental state.[34] If according to Descartes the *referential content* of an idea is essentially determined by the

[33] Descartes was not thereby advocating a holistic account of representation, according to which mental representations would represent only insofar as, taken together, they constitute a system whose items stand between themselves in the same relations that hold between the represented entities. According to Descartes any single idea represents indeed by its own force, by virtue of its objective reality which is "hooked" to the object it is about. Still, for Descartes a sensory idea taken in isolation only informs the perceiver that the body in front of him has a corresponding property, without yet disclosing anything more about its true nature.

[34] One more crucial difference is of course that according to Descartes ideas directly represent the objects they are ideas of, whereas in the case of language the standard theory called upon a mediating entity between the symbol

objective reality of the idea, he argued on the other hand that this does not imply by itself that all ideas necessarily present the objects they are about precisely as they are, which is precisely the point he tried to illuminate by means of a comparison with language. As already pointed out in the previous chapters, although according to Descartes the ideas of hot and white have as their objects some real features of bodies, he thought it would be unwarranted to conclude therefrom that bodies are indeed hot as we perceive them to be, that they have "the selfsame whiteness or greenness which I perceive thought my senses to be present in them".[35] By appealing to a semiotic model of representation as far as sensory ideas are concerned, Descartes did not intend to abandon the core claim of his theory of intentionality that the *referential content* of an idea is defined by its objective reality, but aimed at questioning the Aristotelians' claim that "a body transmits [to the perceiver] its likeness (*similitudo*) rather than something else".[36] If the objective reality of sensory ideas make sure that they represent, according to Descartes their epistemological opaqueness only permits nonetheless to conclude that "that there is *something* in the fire, whatever it may eventually turn out to be (*aliquid, quodcunque demum sit*), which produces in us the feelings of heat", since we lack "convincing argument for supposing that there is something in the fire similar (*aliquid simile*) to the heat".[37] The idea of white and the idea of green do according to Descartes represent, and being ideas of different colors must represent different features of bodies, but this is all it can be said with certainty:

> from the fact that I sense very different colors, sounds, smells, flavors, hot, hardness and the like, I am correct in inferring that in the bodies which are the source of these various sense-perceptions there are some corresponding, though perhaps non-similar, differences (*iis respondentes, etiamsi forte iis non similes*).[38]

According Descartes (to come back to the scheme already presented in §11), it is however impossible to determine merely on the basis of sense-perceptions the true constitution of bodies:

Descartes remarked that even images do not in fact work as *representations* by simply being *pictorial likenesses* of the objects they are intended to depict: in perspective drawings, as a matter of fact, "in order to be more perfect as images and to represent an object better… [they] must

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and its referent (a mediating entity which according to the standard "semiotic triangle" is indeed no other than a mental representation of the referent).

[35] *Meditationes* VI; AT VII 82, 1-10; CSM II 56-57*.

[36] *Meditationes* III; AT VII 38, 20-22; CSM II 26*.

[37] *Ibid.* AT 83, 6-12; CSM II 57.

[38] *Ibid.* AT VII 81, 17-22; CSM II 56*.

not resemble it".[39] Descartes thought that analogous considerations applied also to the more abstract sort of similarity defended by thinkers such as Aquinas and Rubio: *formal identity* between the mental representation of an object and the object itself. According to Aquinas and Rubio, in case no error occurs the assimilation process would indeed culminate in a mental representation that presents the perceiver with the *form* of the object, in one case "realized" in matter, in the other in the perceiver's soul. For how much Roger Bacon, Aquinas and Rubio disagreed on the nature of the *species* and of the assimilation process, at the bottom level they all subscribed in fact to an *assimilation* model of perception and cognition. Accordingly, although their accounts of the in-between stages of the visual process differed, none of these thinkers ever questioned the identity between its prime and its ultimate term: between the external object, namely, and the perception thereof – its "idea", in Descartes' terms. It was precisely in order to safeguard the formal identity between the extreme stages of the perceptual process that Rubio claimed that the *species* is "naturally designed" (*naturaliter ordinata*) to bring about a sensation which is formally identical to its ultimate cause despite being non-similar thereto, in analogy to a seed like an acorn, which is produced by an oak and generates an oak while yet being clearly diverse from an oak-tree.

Aristotelians maintained in fact that the task of the cognitive process was to form a faithful mental representation which presented the object *as it was*. Thinkers like Aquinas and Ockham would have admittedly had the conceptual resources to dissociate representation from similarity *from a conceptual point of view*. Ockham in particular was indeed modelling the relation between mental representations and the represented objects in terms of word-language rather than in terms of images. But when Pasnau appeals to "the *logical resemblance* between the wavelength of the light and the binary code in a machine"[40] to account for Aquinas' theory of representation, he neglects the fundamental point that for Aquinas too (as for all Aristotelians) bodies are truly colored. *Rubedo*, *albedo* and the like are indeed for both Bacon and Aquinas, for both Ockham and Rubio, real properties of bodies, on a par with their being extended and having a shape. For how much most of the exponents of this philosophical tradition rejected to ground the assimilation process on pictorial similarity, "assimilation" was not for them a mere way of speaking. Aristotelians could not content themselves with an orderly one-to-one

[39] *Dioptrique* IV; AT VI 113, 8-25; O 90.

[40] Robert Pasnau, *Theories of cognition in the later Middle Ages* (Cambridge: Cambridge University Press 1997), 95 (emphasis added). *Ibid.* 94: "To be sure, an object of one color can be a likeness of an object of another color… Imagine further a color detector that works by reading the frequencies of light emitted from colored objects. Isn't the machine internal representation of those frequencies (encoded, say, in binary form) a likeness of a color?".

correspondence between sense-perceptions and objects: according to Bacon as well as to Aquinas, to both Ockham and Rubio, of the alternatives presented in the scheme from §11 reproduced above only one was legitimate, whereas all remaining ones had to be left aside as instances of misperception.

Pasnau himself, actually, despite his insistence that Aquinas had a very abstract notion of representation, admits that that similarity had indeed role to play in Aquinas' account – and a really crucial one, as a matter of fact. Pasnau points out in fact that

> in claiming that *species* are likeness, Aquinas clearly does want to rule out the possibility that they represent entirely by convention, as if God might have *arbitrarily* determined that mental state *M* will represent object *O*.[41]

It is precisely at this point that Descartes parted his way with Aristotelians': according to Descartes, God might indeed have decided to associate the same brain state with a different mental state (from which Descartes concluded, as shown in what follows, that also the relation between mental state and the corresponding objects is – as far as purely sensory ideas are concerned – wholly arbitrary). This is what Descartes' theory of an "institution of nature" is all about, and the true keystone of Descartes' argument that bodies are other than we perceive them to be: the wavelength conception of light to which Pasnau appeals in order to completely divorce representation from similarity stems indeed from the *Traité de la lumière* and the *Dioptrique*, not from the *Summa contra Gentiles*. The Medieval theories of mental representation, sophisticated as they may have been, were indeed always constrained right from the beginning by the assumption that the starting and the ending term of the process had to be the same in kind – that they had to be *similar*.

In the *Sixth Meditation*, on the other hand, after having claimed that a certain motion of the nerves "is instituted by nature to produce in the mind a sensation of pain as occurring the foot" (the passage has already been quoted above), Descartes wrote that "the nature of man could have been constituted (*constitui*) by God such that the same motion in the brain presented the mind with something different" – with a different sensation, namely.[42] The shift from nature to

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[41] Pasnau, *Theories of Cognition in the Later Middle Ages* 112 (emphasis in the original).

[42] *Meditationes* VI; AT VII 88, 7-13; CSM II 60-61* (emphases added): "cum nervi qui sunt in pede vehementer & præter consuetudinem moventur, ille eorum motus, per spinæ dorsi medullam ad intima cerebri pertingens, *ibi menti signum dat ad aliquid sentiendum*, nempe dolorem tanquam in pede existentem, a quo illa excitatur ad ejus causam, ut pedi infestam, quantum in se est, amovendam. *Potuisset vero natura hominis a Deo sic constitui, ut ille idem motus in cerebro quidvis aliud menti exhiberet*: nempe vel seipsum, quatenus est in cerebro, vel quatenus est in pede, vel in aliquo ex

God should not surprise, given the definition of nature introduced by Descartes just a few pages before:

> For if nature is considered in its general aspect, then I understand by the term nothing other than God himself, or the ordered system of created things instituted by God (*rerum creatarum coordinationem a Deo institutam*). And by my own nature in particular I understand nothing other than the totality of things bestowed on me by God.[43]

The reason why the "institution of nature" is sometimes described by Descartes in terms of a divine institution is indeed because nature itself has been according to Descartes instituted by God. "The nature of man could have been constituted by God such that the same motion in the brain presented the mind with something different". Descartes made this claim while trying to explain that the existence of perceptual errors is not to be blamed on a faulty constitution of man's cognitive faculties (and, accordingly, on an imperfection on God's part in creating them). For the time being, Descartes' "theodicy" of sense-perception might however be left aside. What is crucial for the issue at stake is rather that for Descartes the relation between brain and mental states is *arbitrary*. (As made clear in the conclusion of this work, Descartes introduced some constraints to the "institution of nature", which had however anything to do with its being *true*, but only with this institution's being "the most conductive to the continued well-being of the body").[44]

With the almost contradictory expression of an "institution of nature", Descartes was in fact trying to capture at one time two different and apparently conflicting aspects of sense-perception. On the one hand, Descartes wanted to argue that it is *in the nature of the mind* to perceive in such-and-such a way (rather than any other) such-and-such a state of the body to which it is conjoined. Accordingly, this institution is to be qualified as "natural". On the other hand, though, for Descartes there are still no reasons why a certain impression on the retina should result in experiencing red rather than any other color. Descartes had appealed to God to establish that the psycho-physiological relation is not casual, but *lawlike*. Still, which specific psycho-physiological law holds true remains for Descartes a matter of choice on God's part, one of his positive laws, since it was open to him to associate the colors and the impressions

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locis intermediis, vel denique aliud quidlibet; *sed nihil aliud ad corporis conservationem æque conduxisset*". *Ibid.* AT VII 87, 5-11; CSM II 60. Although Descartes is here discussing the *location* of the pain, the same would hold equally true for the *sensation* of pain as such.

[43] *Ibid.* AT VII 80, 21-26; CSM II 56*.

[44] *Ibid.* AT VII 88, 12-14; CSM II 61: "nihil aliud ad corporis conservationem æque conduxisse".

left on the retina according to some different principles (by inverting the color spectrum, for instance, switching red and blue). And this, in turn, would have "the nature of man" to be different. By replacing Rubio's account, grounded on a biological metaphor, with a semiotic model, Descartes intended in fact to make room for a *plurality* of *equally legitimate* experiences as a result of the same sense-impressions, which is precisely what Rubio meant to rule out. If an acorn cannot but generate an oak, this tree is on the other hand designated with some different names in different languages. For Descartes the relation between the texture of a body's surface and the experienced color is indeed no less arbitrary than designating this hue as "rosso", "rouge" or "rot".[45]

The reason why Descartes, contrary to Rubio and all Aristotelians, can make room for such a plurality of equally legitimate sensory experience is indeed (as it should be obvious at this point of the story) that he is no longer committed to the assimilation model. Whereas Rubio started from the *assumption* that (in case no perceptual error occurs) the object is indeed exactly as is perceived to be, Descartes was asking for the *reasons* to endorse this claim, rather than subscribing to the thesis that the differences in sense-perceptions correspond to differences in nothing but the geometrical properties of bodies – extension, shape and motion, namely – that Descartes thought to have already established to be real (actually, essential) properties of material objects thanks to his first philosophy. Rubio's idea that the *species* is *naturaliter ordinata* to bring about a sensation other than itself became thereby in Descartes' hand a decisive argument *against* the assimilation model. Descartes contended that if the experience of red is not elicited by anything truly red but only by a certain pattern of motions impressing firstly the retina and hence the brain, there was indeed no reason to claim that a certain configuration of the body's surface could not account for these physiological impressions. In Descartes' views, once the

[45] It is worth pointing out that Descartes rejected Rubio's biological account grounded on an alleged intrinsic finalism even as far as living beings are concerned, in this case too trying to account for the formation of the human being from the foetus (and, accordingly, of the oak tree from the acorn) in purely mechanical terms. It is also important noticing, though, that whereas at least some Aristotelians could account quite straightforwardly for the content of sense-perception as the result of the action of one body upon another (we do see red as a result of a certain coloring of the sense-organs caused by a *species* of a certain color – in this case, red), Descartes' solution hinges on a direct appeal to God as a creator, who is said to have "constituted" the human mind in a certain way. As it has shown to be the case for the deduction of physical laws (to which one could add the validation of the rule of truth), God plays indeed a crucial role for Descartes' philosophy – way more than for most Aristotelians. Although most of Descartes' arguments against Aristotelian theories of perception are compelling, one should always keep in mind that Descartes' own solution does not come without a price (and a pretty high one in fact), which proves to have made his philosophy hardly palatable for contemporary thinkers.

Perspectivists' model is abandoned (and Vesalius and Kepler had shown that it was indeed to be abandoned), there were indeed no arguments left in favor of the existence of properties like *rubedo* in bodies. If the passage from one stage to the other of the sensory process demands in fact to be explained in terms of a mere correspondence, Descartes concluded that the *entire process* could be accounted for in these terms and had in fact to be accounted for along those lines as long as this was the best explanation available (I expound on the strategy of Descartes' argument from parsimony in the next chapter). If the properties first philosophy had already proven to be in bodies are in fact enough to account for the content of perception, for Descartes is would indeed have been superfluous and hence irrational to ascribe to material objects any "real quality" as the Aristotelians had been doing for centuries as a result of having grounded their theory of perception on the concept of similarity, to the point of calling *similitudines* the intermediaries of the perceptual process.

Descartes was so ready to advance his own account of the different stages of the perceptual process, where contrary to what Aristotelians had always been claiming, the first and the last term were indeed truly different independently of any misfunctioning of the sense-organs:[46]

Descartes, accordingly, argued that one should be careful about the meaning and the semantic of the words that designate sensory qualities. "Color" and analogous words, although referring to physical properties of bodies, had indeed been introduced in relation to the *ideas* we have of these properties. As long as the idea and the corresponding property in bodies were taken to be similar, the confusion between the two meanings of the word was however pretty much harmless. But if one is consistently to maintain (as Descartes intends to) that the two are similar under no regard, then it becomes crucial to distinguish between them also in language. Descartes did not address the issue at length (contrary to what done by Reid, for example), but he clearly articulated the distinction between the two usages of the terms under question by speaking of "the properties in external object to which we apply the terms «light», «color», «smell», «taste», «sound», «heat» and «cold»".[47] Descartes' point was not to defend a radical nominalism about the above-mentioned terms, as seems on the other hand to have been the case for the atomists and Galileo.[48] Descartes' intention was rather to warn against the

[46] The squares in Descartes' cases are represented as different also as far as all the stages of the physical and physiological stage of the perceptual process are concerned because (as already pointed out in the previous chapters) for Descartes they are in fact not similar – or only residually so.

[47] *Principia* IV 198; AT VIII-1 322, 11- 323, 2; CSM I 285* (emphases added).

[48] Contrary to what argued by Lawrence Nolan, "Descartes on 'What We Call Color'" in Id. ed. *Primary and Secondary Qualities: The Historical and Ongoing Debate* (Oxford: Oxford University Press 2011), 81-108.

philosophical misconceptions induced by language, as Francis Bacon (and not only Bacon) had already insisted before him. The common usage of words would in fact suggest that the property of "being colored" in bodies is one and the same in kind with our *idea* of this property. Within the Aristotelian framework – within any unmitigated realist framework, as a matter of fact – using the same word to refer to both is indeed not only pretty much inoffensive, but almost a natural consequence of the system. And it is precisely against this tacit supposition at work every time one speaks of "colors" that Descartes intended to react. The color-idea and the color-property ("the properties in external object to which we apply the term «color») must indeed for Descartes be kept distinct in language, as they are indeed diverse.

Once should be careful here not to misconstrue Descartes' statements. Although Descartes rejected the view that bodies have a color of their own, he did not thereby intend to claim that the content of experience is wholly random, so that the same impression on the retina would sometimes presents the same perceiver with red, some others with blue. Were a cause to bring about different effects with no reason, the very possibility of a natural order would in fact be destroyed, whereas Descartes claimed to have firmly established that such an orderly constitution of reality is the case by appealing to God and, more specifically, to its constancy in keeping finite substances (both extended and thinking ones) into being. As Descartes had been the first thinker to formulate overarching laws of motion governing the passage from one state of the corporeal universe to the other, so he first *entertained* the thought of a *psycho-physiological law* governing the relation between mind's and brain's states: the "institution of nature", namely.[49] For Descartes the "institution of nature" is indeed a *law*: a psycho-physiological law. It is an *arbitrary* law, however. The law governing the mind-body union must indeed remain contingent since according to Descartes the mind-body union itself is indeed *non-necessary*.

Any reader conversant with Descartes' writings would at this point object that this claim is trivially true for Descartes, who expressly maintained that also logical and mathematical laws

[49] See the already-mentioned *Conversation with Burman* (16 April 1648); AT V 163-64; K 346: "God made our body like a machine, and he wanted it to function like a universal instrument which would always operate in the same manner in accordance with its own laws (*quod semper operaretur eodem modo juxta leges suas*). Accordingly, when the *body* is in good health, it gives the soul a correct awareness; but when it is ill, it still *affects the soul in accordance with its own laws* (*juxta leges suas ita afficit animam*), and the necessary result of this is a state of awareness whereby the soul will be deceived. If the body did not induce this misleading state, it would not be behaving uniformly and in accordance with its universal laws; and then there would be a defect in God's constancy, since he would not be permitting the body to behave uniformly, despite the existence of uniform laws and modes of behavior (*non ageret æqualiter & juxta leges suas universales, essetque in Deo defectus constantiæ, quod illud non permitteret æqualiter agere, cum æquales agendi modi & leges adsint*)".

are in fact arbitrary, so that it would appear safe to conclude that for Descartes *all* laws are ultimately *modally equivalent*. Descartes insisted in fact that God's freedom in establishing logical principles is *completely* unrestrained, arguing that the existence of *any* "eternal" truth – might even be the principle of contradiction – would set a limit to God's omnipotence. As he made clear to Mersenne:

> The mathematical truths which you call "eternal" have been established (*etablies*) by God and depend on him entirely no less than the rest of his creatures. Indeed, to say that these truths are independent of God is to talk of him as Jupiter or Saturn, and to subject him to the Styx or the Fates […] You ask also what necessitated God to create these truths, and I reply that he was free to make it not true that all the radii of the circle are equal – just as free as he was not to create the world.[50]

For Descartes the arbitrary character of these laws does not however jeopardize the orderly constitution and intelligibility of the world but, as a matter of fact, grounds it and makes it possible in the very first place. "It will be said: "If God has established these truths, he could change them as a king changes his law". Yes" (replies Descartes) but only "*in case God's will could change*".[51] But this for Descartes is exactly the point: God's will cannot change, since (so the argument goes) any change would imply an imperfection on the most perfect being, which is however just contradictory. There is indeed a sense in which – although "created" – Descartes claims that the metaphysical and logical principles that govern the world can in fact be said to be necessary, insofar has God has willed them (although not necessarily, of course) to be so:

> But just as the poets suppose that the Fates were originally establihsed by Jupiter, but that after they were establihsed he bound himself to abide by them, so I do not think that the essences of things, and the mathematical truths which we can know concerning them, are independent of God. Nevertheless I do think that they are immutable and eternal, since the will and decree of God willed and decreed that they should be so.[52]

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[50] To Mersenne, 15 April 1630 & 27 May 1630; AT I 145, 7-13 & 152, 19-23; K 23* & 25.

[51] From the same exchange with Mersenne; 15 April 1630; AT I 145, 28 - 146,1; K 23*.

[52] *Responsiones* V; AT VII 380, 5-13; CSM II 261. Cf. *Responsiones* VI; AT VII 436: "Nec proinde putandum est æternas veritates pendere ab humano intellectu, vel ab aliis rebus existentibus, sed a solo Deo, qui ipsas ab æterno, *ut summus legislator, instituit*" (emphasis added). On the topic see at least Jean-Luc Marion, *Sur la théologie blanche de Descartes* (Paris: Presses Universitaires de France 1981) and Andrew Pavelich, "Descartes's Eternal Truths and Laws of Motion", *The Southern Journal of Philosophy* XXXV (1997): 517-37.

God, so claims Descartes, "has willed that *some truths* (*quelques veritez*) should be necessary" – metaphysical and logical truths, namely.[53] Are psycho-physiological laws too "necessary" in this sense? According to Descartes they are not. Even if for Descartes both logical and psycho-physiological laws are, at the bottom level, contingent upon God's will, in Descartes' views they are not on a par. In the present world, in fact, *all rational beings* agree and must agree that the principle of contradiction holds true, since as a matter of fact (given God's decision) it cannot be the case that both *p* and *non-p* are true at the same time. Likewise, *all sentient beings* must perceive bodies as having an extension and a shape, being these real properties of material objects. But in case – and Descartes thought to have established that this was indeed the case – *res extensæ* are neither red nor blue, if another sentient being (a perceiver other than man, namely) was to perceive the color spectrum as inverted this would on the other hand entail no error on the perceiver's part and, by the same token, no deception on God's. In Descartes' views, in fact, what the experienced differences between phenomenal colors do represent are indeed actual differences in the physical constitution of bodies (and, thus, of the impression they cause on the retina). By itself, however, this does not require *color-sensations* to be the same for all sentient beings: only physical differences are so. Still puzzled by the new findings in vision theory half a century after Kepler's *Paralipomena*, Walter Charleton dramatically asked: "where is that Oedipus, that can discover any Analogy betwixt the Retina Tunica, Optick Nerve, Brain or Soul therein resident, and any one Colour?"[54] According to Descartes, Charleton' question and the Sphynx' enigma had one and the same answer: "man" or, more precisely, the institution of man's nature, which alone could make sense of the relation between the physiological and the mental stage of the visual process.[55]

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[53] To Mesland, 2 May 1644; AT IV 118, 25 - 199, 1; K 235: "And even if God has willed that some truths should be necessary, this does not mean that he willed them necessarily".

[54] Walter Charleton, *Physiologia Epicuro-Gassendo-Charletoniana: or a Fabrick of Science Natural, Upon the Hypothesis of Atoms* (1654); reprinted by R. H. Kargon ed. (New York - London: Johnson Reprint Corporation 1966), 197.

[55] By claiming that the relation between brain and mental states is grounded on *human* nature, Descartes implicitly rules out the possibility that different beings of this species could perceive differently as a result of the same brain states (although of course because of a different constitution of the nervous system an identical stimulation of the sense-organs of two individuals of this species could ensue in different brain states – and, hence, in different sense-perceptions). As argued in this chapter and more extensively in the conclusion to this work, it seems indeed that according to Descartes what makes of some embodied minds the members of one and the same kind – in this case, of mankind – is precisely their being "instituted" in the very same way. Accordingly, perceiving red and no other color as a result of a certain brain state would seem for Descartes to be more revealing of what it is to be a human being that being the only one "two-legged animal without feather".

It can therefore be perfectly explained why already in his first writings Descartes started to argue that the content of sense-experience is not simply *taken in* by the perceiver from external objects and why, in the course of the years, he realized more and more that it was crucial to articulate in detail the sense in which this content has to be *brought in* by the perceiver himself. Even well before his polemic with Regius, Descartes claimed that sensory-ideas too must in fact be, in a sense, "innate" (a sense already spelled out in §4 and §6).[56] The persistence of this thesis, albeit variously articulated, throughout all Descartes' works should not surprise: each of Descartes' works was indeed pursuing, each of them in its own way, the same goal Descartes had set for himself in the *Meditations*, and revealed – under the promise of keeping it secret – to Mersenne: the outright refutation of Aristotelian Scholastic epistemology and metaphysics. Descartes' theory of an "institution of nature" has indeed a goal that goes well beyond accounting for the relation between retinal image, brain states, and ideas. By means of this theory Descartes' most ambitious goal was to show that instead of adding some other entities to material substances, what was required in order to account for sense-perception was a brand-new theory of the mind, which could eventually make sense of a few age-old metaphysical and epistemological questions as well as of the new findings in optics and physiology. By construing the nature of the *mind* the way he did, Descartes intended to show that the nature of *bodies* was completely different than most of his predecessor had taken it to be.

[56] See especially To Mersenne, 22 July 1641; AT III 418; CSMK 187*: "I maintain that all those ideas that involve no affirmation or negation are innate in us. For the sense organs do not bring us anything which is like the idea awoken in us on their occasion. Therefore, this idea must have been in us before".

§26. Descartes' razor

Descartes' argument to eliminate from the world all non-corporeal substances other than the human mind, including all the "real qualities" and "substantial forms" of the Scholastics (which, as §17 as shown, were construed by Descartes in terms of non-corporeal *substances*) is therefore ultimately to be understood as an argument to the best explanation driven by ontological parsimony. As pointed out in §§18-20, Descartes did not rule out *a priori* that non-human animals too had in fact a mind, but argued that there were no reasons to posit any like an entity insofar as the entire behavior of all animals other than men could be explained by appealing to nothing but the geometrical properties of matter and the laws of motion. Likewise, Descartes did not deny the *metaphysical possibility* that bodies were something more than "extended things", but insisted that this claim was unwarranted and, therefore, to be rejected. Whereas in the case of human beings some of the actions they perform provide indeed a positive evidence that to their bodies is attached a non-corporeal principle of action (i.e. a mind), Descartes claimed that this is not the case with any other bodies, which must therefore be regarded as nothing but extended substances, with no thinking – or, more in general, non-corporeal – substances attached.

As shown in the second part of this work, Descartes criticized the Scholastic theory of real qualities and substantial forms on quite a few different grounds. From a purely metaphysical point of view, Descartes argued that the very concept of something capable of existing by itself without yet being a substance – as it was the case according to Aristotelians for "*real* qualities" – was a plain contradiction in terms. Descartes insisted that even once re-conceptualized in terms of non-corporeal substances that there were however no reasons to posit entities which (in Descartes' view) carried out no explanatory work. According to Descartes the entities introduced by the Scholastics were indeed problematic also from a purely epistemological point of view. Metaphysically contradictory, epistemologically superfluous, with no arguments in the favor of their existence and quite a few against it, in a letter to Mersenne written at the time of the *Meditations* Descartes scorned substantial forms and real qualities as "nothing but chimeras".[1]

Descartes' rejection of substantial forms and real qualities in the published works of the period was no less stern, although Descartes adopted therein less virulent tones. Some statements to be read in the letters seem however to suggest (and did in fact suggest to some scholars) a quite different picture, according to which the difference between private and public

[1] To Mersenne, 28 October 1640; AT III 212: "l'École on n'explique pas bien cette matière, en ce qu'on la fait *puram potentiam*, & qu'on lui ajoute des *formes substantielles*, & des *qualités réelles*, qui ne sont que des chimères".

text would count as definitely more than a mere difference in phrasing. According to this alternative interpretation, the reason why Descartes in the *Essays* and his subsequent publications styled his argument as an argument from parsimony was only because he wanted to understate as much as possible his opposition to received views. Although presented as a razor, Descartes' argument against real qualities and related notions would in point of fact be a much stronger – possibly even a priori – sort of reasoning. The key piece of evidence in favor of this reading comes from a letter of January 1642, where Descartes instructed Regius about the policy to adopt in contesting Scholastic metaphysics:

> Why did you need to reject openly substantial forms and real qualities? Do you not remember that on page 164 of my *Meteorology* [the passage is quoted in full and discussed immediately below] I said quite expressly that I did not at all reject or deny them, but simply found them unnecessary in setting out my explanations? If you had taken this course, everybody in your audience would have rejected them as soon as they saw they were useless, and in the mean time you would not have become so unpopular with your colleagues.[2]

Descartes' suggestion to Regius to avoid as much as possible an overt disagreement with received views is of a piece with Descartes' practice in the *Meditations*. In a well-known and already quoted letter to Mersenne, Descartes confessed in fact to his correspondent that the 1641 work contained "all the foundations of his physics", but that he had tried to conceal this fact for his treatise in order to gain acceptance among Aristotelians. Descartes warned Mersenne that for this strategy to work, its ultimate intention was nonetheless to remain unspoken:

> But please do not tell people, for that might make it harder for supporters of Aristotle to approve them. I hope that readers will gradually get used to my principles, and recognize their truth, before they notice that they destroy the principles of Aristotle.[3]

A question forces thus itself: did Descartes, in his public writings, present his argument against real qualities as an argument from parsimony out of "political" reasons, or is this in fact Descartes' true argument in favor of the claim that bodies are nothing but extended substances? The close analysis of the *Meditations* and of the relevant passages of the first and second book

[2] To Regius, January 1642; AT III 492; K 205: "Ut, de ipsis formis substantialibus & qualitatibus realibus, quid opus tibi fuit eas palam rejicere? Nunquid meministi me, in *Meteoris* pag. 164, expressissimis verbis monuisse ipsas nullomodo a me rejici aut negari, sed tantummodo non requiri ad rationes meas explicandas? Quod idem si fuisses secutus, nemo tamen ex tuis auditoribus non illas rejecisset, cum nullum earum usum esse perspexisset, nec interim in tantam collegarum tuorum invidiam incidisses".

[3] To Mersenne, 7 February 1641; AT III 298; K 173.

of the *Principles* carried out in §§13-17 have shown that in these texts Descartes presented in fact no arguments *from first philosophy* against real qualities and substantial forms. In the all-important and already quoted letter to Christina of Sweden concerning the argumentative strategy of the *Principles*, Descartes was indeed as explicit as possible that the demonstration that bodies do not possess the sensible real qualities attributed to them by Scholastics had to wait till the very end of the work, when the entire system in natural philosophy would have been laid out:

> While reading the book, finally, it is mandatory to keep in mind that, although I take into account, in bodies anything but the magnitudes, shapes and movements of their parts, I do nevertheless claim to explain there the nature of light, of heat and of all other sensible qualities. For I assume that these qualities are only in our senses – as tickle and pain are – and not in the objects we sense, wherein nothing is to be found apart from certain shapes and motions, which cause the sensations we name "light", "heat" and so on. I explained and proved this claim only at the end of fourth part of the work, even though, to understand it better, it would be appropriate to notice and to keep notice of it from the beginning of the treatise.[4]

The second part of this work has moreover been intended to provide evidence for an even stronger claim: namely, that Descartes *could not have any a priori* argument against the existence of non-corporeal substances (this being, once again, Descartes' own reconstruction of the Scholastic entities just mentioned), since like an argument would have *proven too much*. It would have proven, indeed, that Descartes' theory of the mind-body union was outright contradictory, as it is precisely in terms of a non-extended substance somehow "attached" to an extended one that Descartes aimed at explaining sense-perceptions, imaginings, the passions and a great deal of man's experience. In the *Meditations* Descartes did indeed set forth – although without insisting on the point – the principles from which he intended to subvert Aristotelism. Only the principles, though: not the entire physics, but only its "foundations", as Descartes himself made clear to Mersenne. In the *Meditations* Descartes took in fact himself to have established (i) that the essence of material substances consists in extension; and (ii) that sensory-ideas *could* turn out not to be similar to their causes and corresponding objects. Only that they *could be*, not that they actually *are*, as attested by the "forte" – "perhaps" – of the last pages of the work on which much has been written in the previous chapters. It was however precisely from this couple of claims that Descartes argued that sensory-ideas are in fact non-similar to the objects they are about and, accordingly, that there is no need to ascribe to bodies any properties beside being

[4] To Chanut for Christina of Sweden, 26 February 1649; AT V 291-92 (my translation).

extended and the pertinent modes of this extension (figure, motion, and so forth). For how much Descartes did not spell out the *possible implications* of these two claims, it cannot therefore be maintained that Descartes, in the *Meditations*, passed his proper argument over silence. If the *Meditations* do not state any argument against the existence of real qualities and related notions this is only because according to Descartes first philosophy alone lacks the resources to spell it out.

What about a writing in natural philosophy such as the *Meteors*, though? Did Descartes think that at least in this case he was in possession of an argument stronger than a razor, which he downplayed only to avoid as much as possible quarrels like the one Regius get involved to in Utrecht, or is the argument from parsimony Descartes' real (and only) argument? In the *Meteors* Descartes is crystal-clear that his rejection of Scholastic metaphysical notions is motivated by the desire for a more austere ontology:

> In order to keep my peace with Scholastics, I have no desire to deny that which they imagine to be in bodies in addition to what I have given, such as their *substantial forms,* their *real qualities* and the like. But it seems to me that my explanations ought to be approved all the more because I shall make them depend on fewer things.[5]

A question yet remains: might he have been willing "to break peace" with received views, could Descartes have presented a direct argument against forms and qualities in bodies? As pointed out above, in a sense Descartes thought he could, insofar as he took the concept of a *real* and yet *non-substantial* entity to be inconsistent. As pointed out above, late Scholastic metaphysics was however flexible enough as to possibly accept that the relation between three-dimensional matter and form could be re-construed (in keeping with Descartes' claims) in terms of a relation between two *substances*, at least in the case of substantial forms. The question, therefore, is shifted one again, and for the last time: could Descartes deny on *a priori* grounds the existence of non-corporeal substances? At this point, however, the arguments presented in the previous chapters should made clear beyond any doubt that this question must receive a negative answer: no like an argument is to be found and can be found in Descartes' writings, either public or private. Descartes' point in his letter to Regius was only that he thought it was more convenient to let the reader himself take the last step of the reasoning, from the lack of

[5] *Meteores* I; AT VI 239, 5-12; O 268*: "Puis, sachez aussi que, pour ne point rompre la paix avec les philosophes, je ne veux rien du tout nier de ce qu'ils imaginent dans les corps de plus que je n'ai dit, comme leurs *formes substantielles*, leurs *qualités réelles*, & choses semblables, mais qu'il me semble que mes raisons devront être d'autant plus approuvées, que je les ferai dépendre de moins de choses" (emphases in the original).

usefulness of real qualities and substantial forms to their no-existence, rather than stating it out loud as Regius had done. This was in a sense a truly "political" consideration, which does not however affect the logic of the argument, but only pertains to the way of presenting it.

As documented in what follows, this is also the case for the argument sketched by Descartes in the *Replies* to the *Meditations* and articulated in the *Principles*, they too being ultimately grounded on a razor. As far as the 1637 *Essais* are concerned is however important to clear the ground from another interpretative error, opposite in kind to one just described. If on the one hand is indeed an error to think that in the *Dioptrics* and the *Meteors* Descartes downplayed an a priori argument into an argument from parsimony out of considerations of convenience, it would be no less mistaken to think that Descartes simply *assumed* for the sake of argument that the essence of bodies consists in extension. The two stages of Descartes' argument that bodies are nothing but extended substances are to be kept distinct in both directions, by neither making of the latter stage, based on natural philosophy, an *a priori* argument, but also by nor interpreting Descartes' claim that the essence of bodies consists in extension as a thesis motivated on methodological grounds, as is on the other hand the case for the razor argument.

It is unfortunately easy to fall prey to this error, since Descartes himself presented in the *Essais* the claim that the essence of bodies is extension (so that they can be taken to be composed of particles whose only properties is to be of a certain size, with a certain shape, in motion or at rest in relations to one another) as a mere "supposition". Descartes went so far as to claim that in the *Dioptrics* and the *Meteors* he was not at all concerned with the actual "nature" of the bodies under examination:

> Thus, not having here any other occasion to speak of light than to explain how its rays enter into the eye, and how they can be deflected by the different bodies that they encounter, *I need not undertake to explain its true nature*. And I believe that it will suffice that I make use of two or three comparisons which help to conceive it in the manner which to me seems the most convenient to explain all those of its properties that experience acquaints us with, and to deduce afterwards all the others which cannot be so easily observed.[6]

Descartes did not moreover restrict this approach to the case of light, but applied it to *all* bodies. In the first chapter of the *Meteors*, although entitled "On the Nature of Terrestrial Bodies", Descartes warned in fact that the claims he was about to make concerning the constitution on bodies were to be taken only as "suppositions":

[6] *Dioptrique* I; AT VI 83, 11-22; O 66.

> Since the knowledge of these matters depends on general principles of nature which have not yet, to my knowledge, been accurately explained, I shall have to use certain suppositions at the outset, as I did in the *Dioptrics*. But I shall try to render them so simple and easy that perhaps you will have no difficulty in accepting them, even though I have not demonstrated them.[7]

Descartes, in this passage, explicitly argues for the thesis that bodies are extended only based on epistemological consideration concerning the simplicity of the model, based on which he argues against the sort of entities invoked by late Scholastics. The first and the second step of Descartes' argument that bodies are nothing but extended substances would accordingly seem to operate according to the very same logic, to the point that it would appear more appropriate to take them as the two sides of one and the same argument. In the *Essais*, moreover, Descartes comes to the point of claiming that he is not even concerned whether these assumptions about what bodies are (and what they are not) are in fact true or false. Descartes would therefore appear be adopting in the *Essais* a purely methodological stance, the same he is usually said to be defending in his early works, first in the *Rules* (whether this is in fact the case is discussed in the *Appendix* to this chapter). Descartes expressly theorized this approach, and defended it by saying that in so doing he was simply "imitating the Astronomers, who, although their assumptions are almost all false or uncertain, nevertheless, because these assumptions refer to different observations which they have made, never cease to draw many very true and well-assured conclusions from them".[8]

As well-known, Descartes did not however in truth agree with Andreas Osiander's attempt to water down the novelty of the Copernican model only as a useful explanatory model. The most dramatic testament of Descartes' committal to heliocentrism is to be found in an all-important letter written towards the end of 1632, where Descartes told to Mersenne that upon discovering of Galileo's condemnation because of his view in astronomy, he was about to set on fire his *Treatise on Light*.[9] Heliocentrism was not for Descartes just a useful hypothesis, or a

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[7] *Meteors* I; AT VI 233, 1-9; O 264*.

[8] *Dioptrique* I; AT VI 83, 22-27; O 66-67*.

[9] To Mersenne, late November 1632; AT I 270-71; K 40-41: "I had intended to send you my *World* as a New Year gift, and only two weeks ago I was quite determined to send you at least a part of it, if the whole work could not be copied in time. But I have to say that in the mean time I took the trouble to inquire in Leiden and Amsterdam whether Galileo's *World System* was available, for I thought I had heard that it was published in Italy last year. I was told that it had indeed been published but that all the copies had immediately been burnt at Rome, and that Galileo had been convicted and fined. I was so astonished at this that I almost decided to burn all my papers or at least to

model to make predictions, but the one true "system of the world", to use Galileo's expression (to be noted that Galileo's *Dialogo sopra i due massimi sistemi del mondo* loses the plural in Descartes's recollection, since the system of the world was for Descartes one and one alone – as was the case for Galileo, indeed).[10] Descartes, actually, thought that heliocentrism was not only empirically true, but that thanks to his physics he could establish *a priori* that the planetary "vortices" are of such a nature as to have at their center the biggest body of that planetary system, and to account for why, given its position, the largest body behave in a completely different way than all the smaller ones in the same vortex (hence the difference between stars and planets). Heliocentrism was so essential a piece of his physics that, according to Descartes, the two stood or fell together:

> I must admit that if the view is false, so too are the entire foundations of my philosophy, for it can be demonstrated from them quite clearly. And it is so closely interwoven in every part of my treatise that I could not remove it without rendering the whole work defective. But for all the world I did not want to publish a discourse in which a single word could be found that the Church would have disapproved of. So, I preferred to suppress it rather than to publish it in a mutilated form.[11]

The astonishment caused by Galileo's condemnation did not fade away over the years: *The World* will see the light only more than a decade after his author's death. Descartes, however, resigned himself during the 1630s to do precisely what he had said to Mersenne he would have never accepted to do: he published *The World* "in a mutilated form" (*estropié*).[12] Describing the *Essays* as a badly abridged version of the 1633 *Treatise* would of course fail to do justice to the great merits of the *Discourse*, the *Dioptrics*, the *Meteors* and the *Geometry*. The topic covered in the last of these essays is in fact nowhere to be found in the *World*, and even when the subject matter of the two works is the same one realizes how Descartes' views evolved and developed in the course of the mid-1630s. Still, in the *Discourse* prefacing the *Essais* Descartes made clear that the

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let no one see them. For I could not imagine that he (an Italian and, as I understand, in the good graces of the Pope) could have been made a criminal for any other reason than that he tried, as he no doubt did, to establish that the earth moves. I know that some Cardinals had already censured this view, but I thought I had heard it said that all the same it was being taught publicly even in Rome".

[10] On the topic is still worth reading Ernst Cassirer, "Wahrheitsbegriff und Wahrheitsproblem bei Galilei", *Scientia* LXII (1937): 121-30 & 185-93.

[11] To Mersenne, late November 1632; AT I 271; K 41*.

[12] Although it should be pointed out that already in November 1630 Descartes presented the *Dioptrique* as a "summary" of *Le Monde*; cf. To Mersenne, 25 November 1630; AT I 179 (despite the fact none of the texts was apparently ready at that point).

reason why we would have opened the *Dioptrics* and the *Meteors* by appealing to some "suppositions" was not because he wanted to defend a purely instrumental or model-based approach to physics. Descartes made clear that he could in fact deduce "suppositions" from the principles of his physics:

> I have called them "suppositions" simply to make it know that I think I can deduce them from the first truths I have expounded above. But I have deliberately avoided carrying out these deductions in order to prevent certain ingenious persons… from taking the opportunity to construct, on what they believe to be my principle, some extravagant philosophy for which I shall be blamed.[13]

The meaning of conclusive remark becomes perspicuous if one goes back to the beginning of the preceding section of the *Discourse*, where Descartes started to present the "first truths" from which he thought that all the "suppositions" of the work could be deduced. As Descartes made clear, in the *Discourse* the reader would nonetheless have found only an abridgment of his considered views on the topic. A proper exposition thereof was indeed to be found "in a treatise, which certain considerations prevent me from publishing".[14] Descartes' reference was extremely discreet, but it should not have hard been for someone conversant with the debates of the time to figure out what he was referring to, and it is absolutely obvious to us now, who have access to both the correspondence and *The World*. The reasons why Descartes presented some of his most important convictions in natural philosophy only as "suppositions" was indeed because he feared ending up like Galileo, or worse, being him (as Descartes himself pointed out) neither "an Italian", nor "in the good graces of the Pope" as had so far been believed to be the case – as was indeed the case – for Galileo.

A closer look to the passage from the outset of the *Meteors* quoted above reveals that, to ground the treatise's "assumptions", for Descartes it was however not even enough to prove that Copernicus was right over Ptolemy. What was needed was indeed no less than an enquiry into "the general principles of Nature", that Descartes laments to be still in demand. "As far as I know, these principles have not yet been properly explained", he remarks. In writing so, Descartes was not however only thinking of his predecessors, but also of the arguments he himself had put forward in both his unpublished writings and in the collection of *Essays* he was presenting to the readers. From the correspondence we know that Descartes' philosophy at the time was in fact already more articulated than the *Discourse on Method* would suggest, and that

[13] *Discourse* VI; AT VI 76, 22 - 77, 3; CSM I 150*.

[14] *Discourse* V; AT VI 41, 22-23; CSM II 132: "un traité, que quelques considérations m'empêchent de publier".

Descartes himself was aware at least of some of the shortcomings of the *Discourse*'s reasoning, immediately detected by the first readers of the work. From the correspondence alone and in the absence of any unpublished text of the period is admittedly hard to speculate how the system in philosophy Descartes had in mind differed from its written 1637 exposition, as well as from the theses Descartes was to present a few years later in the *Meditations*.[15] The passage quoted above from the first chapter of the *Meteors* (as well as the exchange with Vatier) are nonetheless clear on at least one point: in order to prove that the essence of bodies consists in extension, Descartes himself was indeed aware that it could not have been enough to claim that that the ideas of extension, shape and motion are "simpler and easier to know" than anything else in bodies, or that they are "clearer and more intelligible" than the ideas of colors and analogous sensory features, which should accordingly be demoted to the class of "obscure and confused" perceptions.[16] As pointed out in §12, it was indeed precisely in order to fill the gaps of an argument he himself regarded as inconclusive and to articulate all of its stages that Descartes resolved to undertake the writing of the *Meditations*. The claim that the particles of water have a certain shape or that light-transmission is to be understood as a movement of such-and-such a kind are indeed for Descartes instances – and consequences – of a much more general claim: that bodies are extended substances, i.e. that they can exist on their own (God's "ordinary concourse" aside) as entities whose only essential property is to be extended and, accordingly, shaped and in motion or at rest. If Descartes had to make some assumptions concerning the specific nature of light in the *Essais* it was because *The World* has not yet been published. The reason why he had to start from some assumptions concerning the nature of bodies in general was, on the other hand, because the *Meditations* had not yet been written.

The interplay between the general part of Descartes' physics and Descartes' specific claims about the nature and behavior of some specific bodies is admittedly tricky and would have to be analyzed case by case. The gap from the thesis that bodies are extended things moving accordingly to some general laws (spelled out in §19) to the claim that the particles of this one body – let us say water – are shaped "like little eels" and, because of having this shape, behave in such-and-such a way is indeed quite wide, and to explain how Descartes intended to bridge it one would have to call into question his entire epistemology of science. Even more basically, interpreters are still debating whether the core claim of Descartes' physics that there are *three* main kinds of particles was intended by Descartes as deducible from the fact bodies are

[15] On the problem of composition of the work see at least Geneviève Rodis-Lewis, "Hypothèses sur l'élaboration progressive des *Méditations* de Descartes", *Archives de Philosophie* 50/1 (1987): 109-23.

[16] *Discourse* V; AT VI 42, 27-31; CSM I 132 (these passages have already been analyzed in §11).

extended, whether it is empirical in nature, or whether (as it seems to be the case) Descartes regarded as grounded on both *a priori* and *a posteriori* arguments via an hypothetical reasoning whose truth was to be established by empirical researches.[17] It is indeed all but trivial to make sense of how Descartes properly intended to account for the specific "suppositions" he was making at the beginning of the *Dioptrics* and the *Meteors*, and Schuster's recent monography has shown once again how subtle and intricated is the reasoning involved. It is accordingly debated what kind of certainty Descartes could claim for his physics, and whether the very notion of a "more than physical certainty" (but still not "metaphysical") invoked at the end of the *Principles* does make sense at all.[18] Although most of these issues are still open to debate, there is however at least one point about which it is possible to be "more than morally certain": namely, that for Descartes the claim that the essence of bodies consists in extension is *not* on a par with his other claims that the particles of this one kind of body are such-and-such. As pointed out in the first part of this work, the simple fact Descartes have sketched an argument from first philosophy in favor of the former claim (and only of this claim) in the *Discourse* that precedes the *Dioptrics* and the *Meteors* suffices to prove that this is not in fact the case.

But let us consider more closely these purported "suppositions". It should indeed be noticed that in the *Meteors* Descartes not only tries his best to understand the difference between the general "supposition" that bodies are extended and all subsequent ones, but remains studiously vague about its scope:

> I assume, first, that water, earth, air, and all other such bodies that surround us (*et tous les autres tels corps qui nous environment*) are composed of many small particles of various shapes and sizes, which are never so well arranged, nor so exactly joined together, that there do not remain many spaces around them.[19]

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[17] On Descartes' theory of the elementary particles, see *Monde* 5; AT XI 23-31; CSM I 88-90.

[18] Cf. *Principia* IV 206; AT VIII-1 328-29; CSM I 290-91.

[19] In the same opening chapter of the *Meteors*, Descartes puts forward two related additional assumptions concerning these particles: (i) that they fill the entire space; (ii) that they are always (at least in principle) divisible. The passage just quoted continues in fact as follows: "and I assume that these spaces are not empty, but are filled with that very fine material by means of which (as I have explained above) the action of light is communicated". Shortly after it can moreover be read: "But in order that you may accept these hypotheses with less difficulty, know that I do not conceive the small particles of terrestrial bodies as atoms or indivisible particles; rather, judging them all to be made of the same material, I believe that each one could be re-divided in an infinity of ways, and that they differ among themselves only as pebbles of many different shapes would differ, had they been cut from the same rock" (O 268). The denial of void and of atomism should not however be understood as additional suppositions, but as explanations of how Descartes intended the corpuscular model to work: Descartes thought that both (i) and

Although not stated explicitly, the phrasing and the rest of the treatise attests at any rate that Descartes intended this assertion as universal in scope – i.e. as valid for all bodies. The point is even more clear is one considers how Descartes introduced the remaining "assumptions" on which his account is based, which concern on the other hand the *specific* constitution of *specific* bodies:

> Then, *in particular*, I assume that the small particles of which water is composed are long, smooth, and slippery, like little eels, which are such that however they join and interlace, they are never thereby so knotted or hooked together that they cannot easily be separated; and on the other hand, I assume that nearly all particles of earth, as well as of air and most other bodies, have very irregular and rough shapes, so that they need be only slightly intertwined in order to become hooked and bound to each other, as are the various branches of bushes that grow together in a hedgerow…

As was reasonable to expect it a collection of essay which was indeed to replace a *Treatise of Light*, beside the elementary bodies Descartes thinks that one more basic physical phenomenon deserved a supposition of its own: light, of course. According to Descartes, some behavior of air particles – or, more precisely, of the particles of "subtle matters" – can in fact be easily explained "if we assume that light is nothing other than a certain movement or action by which luminous bodies impel this subtle matter in straight lines, in all directions around them, as has been stated in the *Dioptrics*".[20]

In the opening chapter of the work, Descartes has however explained that this understanding of light was not onyl intended to account for the fact air particles "move faster toward places near the Equator than towards the Poles". By conceiving of light in these terms, Descartes thought that he could indeed make sense of even more complex physical phenomena, such as light's instantaneous propagation.[21] In order to make a case for this theory of light, at the outset of the *Dioptrics* Descartes asked his readers to consider the example of a blind man, who helps himself with a stick to get around the world, assessing with the tip of this stick

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(ii) could in fact be immediately inferred from his conception of extension. For an insightful analysis of the issue see Daniel Garber, *Descartes' Metaphysical Physics* (Chicago - London: University of Chicago Press 1992), 94-155.

[20] *Meteores* I; AT VI 234, 20-25; O 265*.

[21] On light propagation, see Abdelhamid I. Sabra, *Theories of Light: From Descartes to Newton* (London: Oldbourne 1967), 46-68. It is worth pointing out that Descartes wrote that, in case it would have turned out that the propagation of light was not instantaneous, "I should be ready to confess that I know absolutely nothing in philosophy"; To Beeckman (?), 22 August 1634; AT I 307-308.

whether he is about to stumble in "stones, or sand, or water, or grass, or mud". Clearly nothing passes from one extreme of the stick to the other, and yet merely on the basis of how the stick's extreme on the ground happens to differently move according to the different objects it encounters, the extreme the blind man has in his hand moves differently, thereby enabling him to tell the difference between the objects he is confronted with. Likewise, according to Descartes, should we understand of light rays: as some sort of "rods" with one extreme in the luminous object and the other in our eye. According to Descartes air particles conceived as he conceived of them would indeed be able to transmit motion – or, more precisely, "a tendency to motion" – from the light source to the surrounding objects (eyes included, of course) in no time:

> I would have you consider light as nothing else, in bodies that we call luminous, than a certain movement or action, very rapid and very lively, which passes toward our eyes through the medium of the air and other transparent bodies, in the same manner that the movement or resistance of the bodies that this blind man encounters is transmitted to his hand through the medium of his stick. This will prevent you from finding it strange at first that this light can extend its rays in an instant from the sun to us; for you know that the action with which we move one of the ends of a stick must thus be transmitted in an instant to the other end, and that it would have to go from the earth to the heavens in the same manner, although it would have more distance to travel there than it has here.[22]

How Descartes intended to achieve this orderly transmission of motions thanks to the round particles that constitute in his mind the heavens is an especially intricated issue, to which Descartes devoted a main portion of *The Treatise of Light* and to which the scholars from Sabra to Schuster have devoted entire books. The specific of Descartes' solution, for how much fascinating, do not however need to concern us at present. What is more important to stress is rather than there was one more decisive reason that led Descartes to model light rays after sticks. By expounding on the case of the blind man, Descartes points out in fact that no *object* of any sort is transmitted from one extreme of the rod to the other. Descartes was indeed applying to the problem of light-transmission from the object to the retina the same model he had employed in the *Rules* to account for the transmission of a motion from the external sense-organs to the brain (already presented in detail in §24). In the *Rules* Descartes explained in fact the physiological stage of the perceptual process by saying that "when an external sense organ is set in motion by an object, the figure that it receives is conveyed at one and the same moment to another part of the body, known as the 'common sense', without any entity really passing from

[22] *Dioptrique* I; AT VI 84, 14-29; O 67.

the one to the other (*eodem instanti & absque ullius entis realis transitu*)".[23] The model Descartes appealed to in the 1628 work to illustrate his point was a pen, not a rod, but this does minor change has of course no bearing on the argument:

> In exactly the same way, I understand that, while I am writing, at the very moment when individual letters are traced on the paper, not only does the point of the pen move, but the slightest motion of this part cannot but simultaneously affect the whole pen. All these various motions are traced out in the air by the tip of the quill, even though I do not conceive of anything real passing from one end to the other (*etiamsi nihil reale ab uno extremo ad aliud transmigrare concipiam*).[24]

Once made clear that the transmission of light (and, hence, of colors; more on this below) does not require the passage of any mediating entity of any kind between the object and the perceiver, Descartes was however ready to apply once again his razor against what he called "the useless junk of Scholastic entities" (*ista supervacua entitatum scholasticarum supellectile*).[25] If Descartes thought that there was no point in positing some "real qualities" in objets, the same in his mind held in fact true also of the *species* that according to Aristotelians "brought" these qualities to the perceiver:

> Hence you will have reasons to conclude that *there is no need to suppose* that something material passes from objects to our eyes to make us see colors and light… And by this means your mind will be delivered from all those little images flitting through the air which so exercises the imagination of Scholastic philosophers, what they called the "intentional species".[26]

An authoritative interpreter argued that the doctrine of the *species intentionales* was so badly defended, not to say understood, by the late Scholastics known to Descartes to fully justify his harsh criticism. Gilson had especially in mind the already-mentioned Eustachius a Sancto Paulo (1573-1640), one of the leading figures of the Counter-Reformation in France. A Feuillant, and a Professor at the Sorbonne, his text was in use also in Jesuit Schools: as well-known, in

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[23] *Regulæ* XII; AT XII 413, 21 - 414, 12; CSM I 41-42*.

[24] *Ibid.*

[25] *Notæ in Programma*; AT VIII-2 366, 22-23. For some contemporary responses to Descartes' criticism, see J. A. van Ruler, *The Crisis of Causality: Voetius and Descartes on God, Nature and Change* (Leiden: Brill 1995).

[26] *Dioptrique* I; AT VI 85, 13-27; CSM II 153-54*: "Ensuite de quoi vous aurez occasion de juger, qu'il n'est pas besoin de supposer qu'il passe quelque chose de matériel depuis les objets jusqu'à nos yeux, pour nous faire voir les couleurs & la lumière… & par ce moyen votre esprit sera délivré de toutes ces petites images voltigeantes par l'air, nommées des *espèces intentionnelles*, qui travaillent tant l'imagination des philosophes" (emphasis added).

Descartes' original plan his own *Summa philosophiæ* was to be followed by a point-by-point critical commentary of Eustachius' *Summa philosophica quadripartita* (first edited in Paris in 1609).[27] Gilson, more specifically, attacked Eustachius for ascribing a full-blown material character to these *species*. Eustachius himself, actually, admitted that it remained to him quite mysterious how something material could nonetheless "spiritually represent" an object: the nature of these *species* is indeed, he claimed, "thoroughly stupendous".[28]

The progressive "materialization" of the *species* that took place between the late 16th and the early 17th century cannot however be disregarded as a mere misunderstanding of an otherwise perfectly sound doctrine (Aquinas', of course, to Gilson's eyes). There were indeed solid reasons that induced philosophers to such a shift, coming from both within and without the Schools: not only Eustachius but also the Jesuit authors Descartes was conversant with defended indeed the (at least partly) material nature of the *species*.[29] On the one hand, some difficulties concerning causation urged Schoolmen to downplay more and more the metaphysical status of the *species*, having them more and more material being possibly the easiest way out of this predicament.[30] On the other hand, Aquinas' understanding in non-material terms of the *species* was only one among the many of the 13th century, which enjoyed less and less fortune in the centuries to come because it has proven simply inadequate to the development of optics. The reason why Gilson claimed that Eustachius came up with the account he did only because of his poor understanding of Aquinas, is only because Gilson had not considered the well-established Medieval and Early Modern tradition alternative to Aquinas', which had strenuously defended

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[27] See Dominik Perler, "Eustachius a Sancto Paulo" in Lawrence Nolan ed., *Cambridge Descartes Lexicon* (Cambridge & New York: Cambridge University Press 2016). Descartes' original plan dropped essentially because of Eustachio's death. Descartes later diminishingly renamed the book *Principia philosophiæ* – only the rudiments of the discipline, namely, rather than the whole thing – because he resigned himself not to include the planned fifth and sixth part on living beings, which were causing him much troubles.

[28] Eustachius a Sancto Paulo, *Summa philosophica quadripartita* (Paris 1609), II iii 330: "Tertia (diffucultas est) quomodo species illæ repræsentant objecta? Respondetur eam esse, & quidem stupendam penitus, illarum specierum conditionem, quod cum sint materiales, utpote in subject inhærentes, modum tamen spiritualem in repræsentando servent". The passage is analysed in Étienne Gilson, *Études*, 25.

[29] Alison Simmons, "Explaining Sense Perception: A Scholastic Challenge", *Philosophical Studies* 73 (1994): 257-75, see especially 264. On late Scholastics theories of the *species*, see the already-mentioned Sven Dupré, "The Return of the *Species*: Jesuit Responses to Kepler's New Theory of Images" in Wietse De Boer – Christine Göttler eds., *Religion and the Senses in Early Modern Europe* (Leiden: Brill 2012): 473-87.

[30] Cf. Cees Leijenhorst, "Active Perception from Nicholas of Cusa to Thomas Hobbes" in José Filipe Silva – Mikko Yrjönsuuri eds., *Active Perception in the History of Philosophy: From Plato to Modern Philosophy* (Dordrecht: Springer 2014), 167-86.

the material character of the mediating entities of the perceptual process. After the Perspectivists had argued for it in the second half of the 13th century, the experts in the vision theory became indeed more and more convinced that this was in fact the right approach to the issue. And not only the practitioners in optics, as a matter of fact.

Faced with Descartes' famous and already-described experiment with a cow's eye located at the aperture of a *camera obscura*, a quite traditional thinker like Fromondus argued that "the intentional *species* of colors" which the Perspectivists had been speaking about for centuries were nothing else but the *imagines* that Descartes' experiment had just proven to be formed on the bottom of the eye (see again §24 for more details).[31] For Fromondus it went indeed without saying that the *species* were material, themselves colored and thereby able to color the organs they impressed. This robustly material understanding of the *species in organo* also urged new questions concerning the *species in medio*, although in this field no single answer prevailed (unsurprisingly enough, given the controversies and doubts over the nature of light). There can be no doubt about Descartes' intention to ridicule his opponents when he styled intentional *species* as "those small images flitting through the air… which worry the imagination of philosophers so much".[32] Still, such an understanding of the *species intentionales* in robustly material terms is not only in keeping with Eustachius' philosophy, but also reflects Kepler's renovated understanding of the *species in organo*. The *species in medio* and the *species in organo* had yet always been treated on a par by Scholastics, so that it was difficult to introduce, all of a sudden, a metaphysical asymmetry between the two, trying to rescue the partly non-material character of the former. Eustachius' account is admittedly clumsy, and no one would contest that he simply cannot compete with Aquinas. Still, he was to face new problems, which forced him (and not only him) to abandon a model which during the centuries has proven inadequate. Descartes did not rule out the *species* because once they were no longer understood in Aquinas' terms they simply made no sense. Descartes rejected the *species* because he thought that even the most up-to-date accounts, despite their attempts to make sense of the developments in optics and of the new problems in the field, failed to explain the perceptual process.[33]

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[31] Fromondus to Plempius, 13 September 1637; AT I 405. Both Fromondus and Plempius were perfectly aware of the debate between "materialists" and "dematerializers" that had taken place in Late Antiquity and in the Middle Ages, which sets the stage for both Eustachius' account and Descartes' criticism.

[32] *Dioptrique* I; AT VI 86, 25-27; O 68: "toutes ces petites images voltigeantes par l'air, nommées des espèces intentionnelles, qui travaillent tant l'imagination des philosophes".

[33] Most Early Modern authors (Hobbes, for example) criticizes the *species* theory by relying on arguments along Descartes' lines. Not all of them, though, and Henry More's own theory on the topic is especially instructing about the difficulties Early Modern philosophers were confronted with, and the varieties of possible approaches to these

The dispute concerning the nature the *species* – either material or spiritual, or somehow intermediate between the two – depended of course also from purely metaphysical consideration. As by his theory of substance Descartes denied the concept of a "real accident", by the same token he ruled out on the same basis the possibility of in-between form of being between the *res extensa* and the *res cogitans* (and relative modes thereof). As a matter of fact, this was a general trend in the philosophy of the time (also among Scholastics) but Descartes' dualism brought it to its most extreme and rigorous consequences, ruling out the very possibility of a "diminished" form of existence between mind and spirit.[34] Roger Bacon has already appealed to an argument along Descartes' lines to defend the purely material nature of the *species*, but he too kept on claiming that *species* are to be understood as entities of a diminished kind (in Bacon' view insofar as, although material, they are still not perceivable *per se*).[35] It is nonetheless crucial not to overrate the role of metaphysics in this debate: Descartes' dualism only ruled out in fact *a certain understanding* of *species*, not the entire theory. It does not indeed seem to be the case that Descartes refuted the theory of *species* as a result of having denied the existence of forms.[36] Descartes' understanding of real qualities in terms of substances put admittedly pressure and constrains on the traditional Scholastic account, but in principle the "real qualities" so understood could still issue *species* construed as Eustachius a Sancto Paulo did. Descartes has indeed never argued that *species* are to be abandoned because hylomorphism is false. Descartes' argument goes rather the other way around: it is because he thought he could prove that the perceptual and physical stages of the perceptual process could be explained without having recourse to *species* and forms that he concluded that to no bodies other than humans' one should ascribe non-corporeal principles of action. First philosophy, according to Descartes, can only clear the ground from *some* metaphysical entities (such as real accidents). In

questions, as nicely shown by Philippe Hamou, "Henry More face à la théorie cartésienne de la vision", *Études philosophiques* 108 (2014): 61-79.

[34] See for example Antonio Rubio, *Commentarii*, 325, where Rubio speaks of an "esse diminutum, & intentionale, non perceptibile per sensum" of the *species*.

[35] See for example Bacon, *Opus maius* II; ed. Bridges 410. The passage is discussed and translated in Richard Sorabji, "From Aristotle to Brentano. The Development of the Concept of Intentionality", *Oxford Studies in Ancient Philosophy* (1991; supp. vol.), 258*: "In the common usage of physicists this [color] is called an *intentio*, because of the weakness of its being with reference to the thing itself, which declares that this is not truly a thing, but rather the *intentio* of a thing, that is, a likeness (*similitudo*)".

[36] As argued by Dominik Perler, "Descartes, Critique de la Théorie Médiévale des *Species*" in Joël Biard – Roshdi Rashed eds., *Descartes & le Moyen Âge* (Paris: Vrin 1998), 141-53.

order to get rid of the entire "useless junk of Scholastics paraphernalia" Descartes thought that something more was needed, though: a razor in the hands of a natural philosopher.

Even if construed in purely material terms as the Perspectivists had always been doing, Descartes argued indeed that Aristotelians were still badly mistaken in their understanding of the impressions on the external and internal sense organs – i.e. of what they called the *species in organo* and the *species in cerebro* – in terms of *similitudines*. Descartes insisted that the recent findings and his own researches on nerve physiology had indeed made clear that brain-impressions could not be taken to be *pictorial likenesses* of the external object that caused them in the first place, contrary to what maintained by Roger Bacon and his followers. In the light of his dissections, Descartes claimed that the Perspectivists' model of perception was in fact empirically untenable:

> It is necessary to beware of assuming that in order to sense, the mind needs to perceive certain images transmitted by the objects to the brain, as our philosophers commonly suppose; or, at least, the nature of these images must be conceived quite otherwise than as they do. For, inasmuch [Aristotelians] do not consider anything about these images except that they must resemble the objects they represent, it is impossible for them to show us how they can be formed by these objects, received by the external sense organs, and transmitted by the nerves to the brain. [37]

As studied at length in §21, to account for this transmission the Perspectivists went indeed so far as to assume that the optic nerves were hollow and, accordingly, capable of conducing light and color from the eye to the brain. Descartes, however, objected that the only reason why Perspectivists embraced this theory despite all evidence to the contrary, was because they had begun their enquiry by (illegitimately, he thinks) equating representation with similarity:

> And they have had no other reason for positing [these likenesses] except that, observing that a picture can easily stimulate our minds to conceive the object painted there, it seemed to them that in the same way, the mind should be stimulated by little pictures which form in our head to conceive of those objects that touch our senses; instead, we should consider that there are many other things besides pictures which can stimulate our thought, such as, for example, signs and words, which do not in any way resemble the things which they signify.[38]

Descartes intended his theory of an institution of nature to provide precisely such a semiotic model of representation, thereby replacing both the pictorial model of the

[37] *Dioptrique* IV; AT VI 112, 7-17; O 89*.

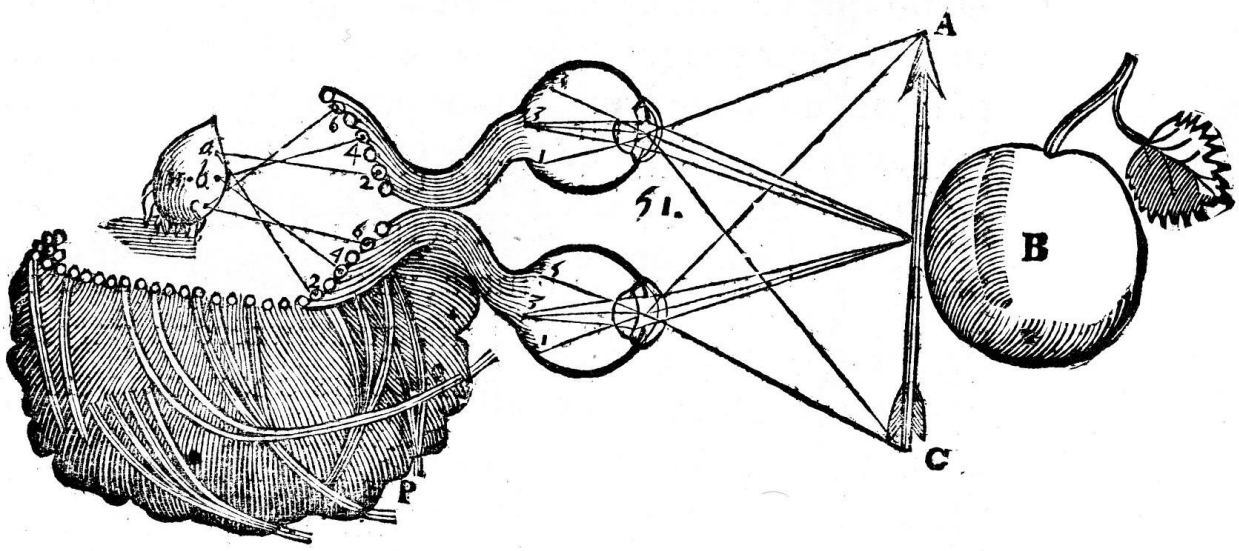
[38] *Ibid.* 112, 17-28: O 89*.

Perspectivists and Rubio's account of a "natural ordination" of *species* to bring about a sensation similar to the object patterned after biological phenomena.

Thanks to the example of the blind man's stick, Descartes wanted indeed to show not only that the transmission of a motion does not required the transmission of any real entity, but also that the motion at the one extreme of the transmitting-body – in this case, the stick; in the case of light, the particles of the second element – does not even need to be *similar* to the motion resulting at the opposite extreme, and in the case of the pen it is in fact not: "the pen as a whole does not move in exactly the same way as its lower end; on the contrary, the upper end of the pen appears to have an altogether different and opposite movement".[39] The only condition the transmitting-body has to satisfy is indeed that different motions at one of its extreme give rise to different motions at the other. Or, to cast the point in different terms, that the set of motions at one extreme of the transmitting-body is *isomorphic* to the set of resulting motions at the opposite extreme. In the case of nerve transmission, this means for Descartes that given the outer extremities of three nerves on the retina (1, 3 and 5) and the corresponding inner ones on the brain ventricle (2, 4 and 6), in case the speed 3 moves is twice 1's, and so between 5 and 3 and if, moreover, 3 is located between 1 and 5, the nervous system is built is such a way as to make the same *relations* hold true between 2, 4 and 6, so to have 4 located between 2 and 6 and its speed of movement half-way between 2's and 6's (whereas is completely irrelevant the ratio 4 moves in relation to 3). Analogously for 2-4-6 and the corresponding pattern of motion *abc* on the pineal gland. Thereby *abc* too is of course isomorph to 1-3-5, the relation of isomorphism being transitive.[40]

[39] *Regulæ* XII; AT X 415, 4-7; CSM I 42*.

[40] The merging together of the "images" coming from the two eyes has already been discussed in §24.



Descartes construed the visual and nervous system the way he did precisely to secure such an orderly *correspondence* between the patterns of motion at any stage of the physiological process. Descartes claimed moreover that the similarity constraint is to be abandoned also as far as the subsequent stage of the perceptual process is concerned: the mental stage. In the *Dioptrics*, by means of the same example, Descartes pointed out that a blind man perceives in fact that objects differ and forms correspondingly different ideas of these objects only on the basis of the diverse ways of moving, or of resisting the movements, of the stick in his hand. But – and this is for Descartes the truly decisive point:

> the resistance or the movement of these bodies, which is the sole cause of the sense-perceptions the blind man has of them, *is similar under no regard* to the ideas he forms of these bodies (*n'est rien de semblable aux idées qu'il en conçoit*).[41]

In his experience, so claims Descartes, a blind man is indeed immediately confronted with trees and rocks, not with the different movements of the stick he has been making use of for so many years. But if the physical, physiological and mental stage of the perceptual process can and are in fact to be explained in terms of isomorphic motion-transmission in the case of *touch* (at least as far as the blind man is concerned), Descartes argues that the *visual* process too could be therefore construed along the same lines. Once the similarity constraint is abandoned, Descartes points out that there is in fact no longer need to suppose that the property of body we designate by the name of "color" is indeed the same as the colors we perceive – i.e. that

[41] *Dioptrique* I; AT VI 85, 21-24; O 68*.

bodies are truly red, and blue, and so forth, as maintained by the Aristotelians. Put forward at the beginning of the *Dioptrics* only on the basis of the analogy with the blind man case, in the rest of the *Essais* Descartes argues as length for this understanding of color-properties as dissimilar to the sense-perceptions we happen to have of them:

> Neither will you find it strange that by means of it we can see all kinds of colors; and you may perhaps even be prepared to believe that these colors are nothing else, in bodies that we call colored, than the diverse ways in which these bodies receive light and reflect it against our eyes: you have only to consider that the differences which a blind man notes among his stick do not seem less to him than those among red, yellow, green, and all the other colors seem to us; and that nevertheless these differences are nothing other, in all these bodies, than the diverse ways of moving, or of resisting the movements of, this stick.[42]

According to Descartes, light consists indeed in a movement transmitted through the small "globules" which constitute what he calls the "subtle matter". When these globules obliquely strike a refracting surface, Descartes thinks that these globules acquire a rotatory motion besides the rectilinear motion of propagation they already had. The rotatory motion acquired by each globule because of this refraction is originally one and the same for each globule (and identical to the speed of its movement of translation), but according to Descartes is affected by the velocity of the surrounding globules. Different light-transmitting globules come therefore to acquire different rotatory motions: greatest for the globules refracted at DF, smallest for the ones refracted along EH (see figg. 19 & 20 immediately below). According to Descartes the differences between our color-sensations represent precisely these differences in rotational velocity of the globules impinging on our retina, the globules with the greatest spin giving rise to the sensation of red, and so on through all the colors of the rainbow till blue, the globules that bring about the idea of this color being for Descartes the ones rotating most slowly.[43] Because of their different textures, bodies according to Descartes reflect light-rays in different

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[42] *Ibid.* AT VI 84, 29 - 85, 12; O 68. By means of his theory of an "institution of nature" Descartes wanted however to make clear that color-experience still differs under one crucial regard from the experience a blind man attains by means of his walking stick. If the blind man can indeed be said to be confronted with "stones, or sand, or water, or grass, or mud" rather than with different movements of the stick he is helping himself with, this is still the result of a *cognitive process*: it is in fact only though active learning or associations induced as a result of habit that he comes to experience such-and-such a movement of the stick as this or the other body, the same way someone able to read is confronted with the meaning of the words rather than with the shape of the single characters. As pointed out in the previous chapter, according to Descartes the "institution of nature" is on the other hand *non-cognitive* in nature.

[43] Descartes devotes to the explanation of this theory a good portion of the *Eight Discourse* of the *Meteors* (AT VI 328-37).

ways, modifying the ratio between the rectilinear and the rotatory speed of motion of the globules transmitting the motion which, upon impinging on our retina, gives rise to the sensation of light: "size, shape, situation, and movement of the particles of bodies we call colored can variously compete with light, increasing or diminishing the rotation of the particles of the subtle matter".[44] Far from demanding the introduction of some "real qualities" superadded to matter, according to Descartes colors could indeed be perfectly explained in terms of the geometrical properties of this matter *and* the nature of the mind (its "institution"). For Descartes the sense-perception of red could indeed no longer be taken to depict to the perceiver the "being red" of the object, its *rubedo*. The difference between red and blue, on the other hand, was indeed representing something absolutely real in bodies: the difference between the "size, shape, situation, and movement of the particles of bodies", a set of which causes the sensation of red, another one the sensation of blue.[45]

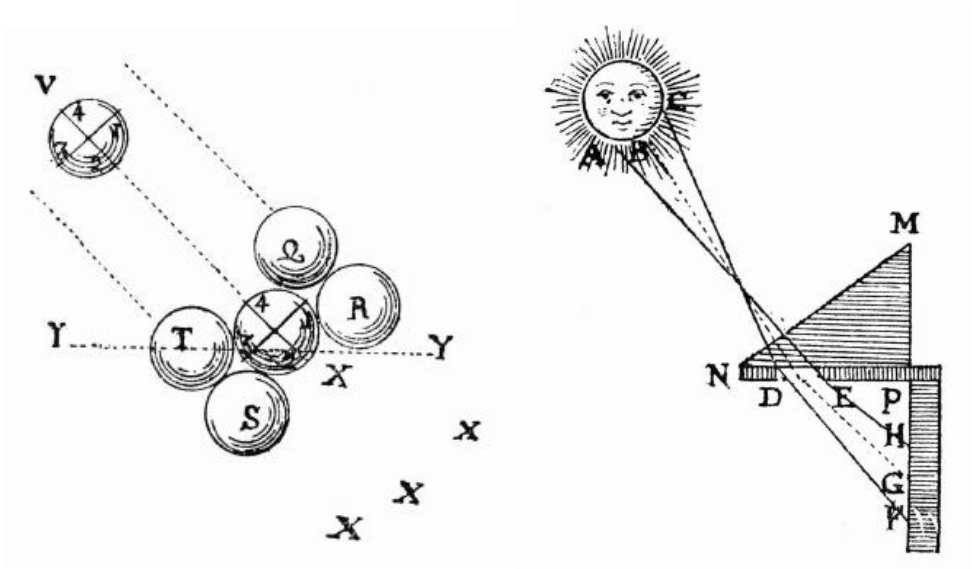

Fig. 19: Descartes' depiction of how the rotatory velocity of the globules is affected by the surrounding globules, according to whether they impede or support this rotatory motion (*Meteors* VIII; AT VI 332).
Fig. 20: The prism experiment used by Descartes to determine the nature of colors (*Meteors* VIII; AT VI 332).

[44] *Meteors* VIII; AT VI 335, 16-22; O 339*.

[45] For a presentation of the main color theories of the time, see Fokko Jan Dijksterhuis, "Understandings of Colors: Varieties of Theories in the Color Worlds of the Early Seventeenth Century" in Sven Dupré – Tawrin Baker – Sachiko Kusukawa – Karin Leonhard eds., *Early Modern Color Worlds* (Leiden: Brill 2016), 227-47.

Thanks to his theory of vision broadly construed as to encompass the physics of light, the physiology of the nervous system and the theory of ideas, Descartes though to have indeed eventually succeeded in showing that the assimilation model of Aristotelians could be replaced by a different model, grounded on representation, which contrary to the Aristotelian did not need to posit entities such as real qualities in bodies and *species* in the medium, in the perceiver's organs, and in his soul. For Descartes, indeed, "the principal argument which induced philosophers to posit real accidents was that they thought that sense-perception could not be explained without them",[46] so that once it would have been proven that the perceptual process could be accounted for without appealing to entities of this sort, there would no longer have been reasons to posit *ista entitatum scholasticarum supellectile* which would have accordingly turned out to be *supervacua*.

In the *Meditations on First Philosophy* Descartes could not of course articulate the entire reasoning without abandoning the subject-matter he had set for himself in that work ('first philosophy', namely). In the *Replies*, however, he made clear that he conceived of the 1641 and the 1637 work as a sort of diptych articulating the two stages of his argument about the nature of bodies, by first proving that they are extended to then argue based on this thesis and on his natural philosophy, thanks to a razor, that they are nothing but so. Descartes insisted that neither in the *Essais* nor in the *Meditations* he had in fact denied *a priori* the existence of real qualities, for how much he took himself to have shown that these entities carry out no explanatory work, and are rather themselves in need of an explanation:

> In the *Dioptrics* and the *Meteorology* I did not make use of such qualities in order to explain the matters which I was dealing with (*non usus sum ad ea de quibus agebam explicanda*). But in the *Meteorology*, p. 164, I expressly said that I was not denying their existence. And in the *Meditations,* although I was supposing that I did not yet have any knowledge of them, I did not thereby suppose that none existed.[47]

In order to dismantle "the principal argument which induced philosophers to posit real accidents", Descartes explained that in his following work (what would have become the *Principles*) he planned indeed to "give a very detailed account of sense-perception… taking each sense in turn".[48] He claimed to have succeeded to show that a more austere metaphysics was enough to make sense of the *visual* process, notwithstanding the fact vision was notoriously the

[46] *Responsiones* VI; AT VII 435; CSM II 293*.

[47] *Responsiones* IV; AT VII 248, 18 - 249, 1; CSM II 173*.

[48] *Responsiones* VI; AT VII 435; CSM II 293*.

most challenging of all senses and the doctrine of the *species* had originally being introduced precisely to account for perception at a distance of light and color. According to Descartes the explanation of vision which he had already given in the *Dioptrics* should indeed "make it easy for the judicious reader to guess what I was capable of accomplishing with regard to remaining senses".[49]

In the *Principles*, as promised, Descartes accordingly devotes a section to each of the external senses: touch, taste, smell, hearing and, finally, vision – these being the subject-matter of §§191-95 of the fourth and last book of the 1644 treatise. After having described the specifics of the physiological stage of these five senses, Descartes hastened to point out that "we observe no difference between the various nerves which would support the view that different nerves allow different things to be transmitted to the brain from the external sense organs", to conclude from that with an ill-important remark (already discussed in detail in §24) that "we are not entitled to say that anything reaches the brain except for the local motions of the nerves themselves".[50] In the same and in the previous section Descartes presents moreover once again his theory of an "institution of nature" (although by calling it by this name only in the 1647 translation). Descartes' line of reasoning is quite packed – he himself refers the reader for more details to the *Dioptrics* – by in the light of what has been said so far it is eventually possible to follow all the premises, the stages and the implications of the argument by which he intended to establish that "by means of our senses we apprehend nothing in external objects beyond their shapes, sizes and motions".

"The principal argument which induced philosophers to posit real accidents" would accordingly be eventually exploded. "Philosophers posited these 'real qualities' only because they did not think they could otherwise explain all the phenomena of nature", wrote Descartes, "but I find on the contrary that these phenomena are much better explained without them".[51] If this is the case, by appealing to a principle of parsimony is should however be concluded that bodies are indeed nothing but extended substances, with no real qualities or substantial forms attached:

> We understand very well how the different size, shape and motion of the particles of one body can produce various local motions in another body… We know that the nature of the soul is such that different local motions are *sufficient* (*sufficient*) to bring about all the sensations in the soul. What it more,

[49] *Ibid.*

[50] *Principia* IV 198; AT VIII-1 321, 24-28; CSM I 284.

[51] To Mersenne, 26 April 1643; AT III 648-49; K 216.

> we actually experience that the various sensations as they are brought about in the soul, and we do not find that anything reaches the brain from the external sense organs except for motion of this kind. In view of all this we have every reason to conclude that the properties in external object to which we apply the terms "light", "color", "smell", "taste", "sound", "heat" and "cold" – as well as the other tactile qualities and even what are called "substantial forms" – are, *so far as we can tell, nothing but* (*non etiam à nobis animadverti… aliud esse quàm*) simply various dispositions <in the shape, size, positions and movement of the parts of> the objects, which make them able to set up various kinds of motions in our nerves.[52]

The passages highlighted and related ones in the surrounding sections have been interpreted by Machamer and McGuire as an evidence – if not *the* evidence – that Descartes in his last years had become less and less convinced that he could provide a metaphysical foundation for his theory of bodies, and ended up his career on a most skeptical note, by taking a purely epistemological stance on the issue.[53] Such a reading depends however from having misunderstood what according to Descartes 'first philosophy' could and what could not demonstrate. The proof that bodies are nothing but extended substances has indeed been conceived by Descartes as a razor since his first extant writings. Over the years Descartes did not grow more and more uncertain about his theory of bodies, but only insisted that the argument in favor of his theory about what bodies are and what they are not unfolds in *two* stages, the latter of which is grounded on an argument from metaphysical parsimony. For how much Descartes scorned the "junk of Scholastic entities", from his texts is indeed clear that Descartes' key objection was that all the "substantial forms" and "real qualities" invoked by his teachers were "useless". "Useless", but not intrinsically contradictory (at least if properly understood). The passages highlighted in the section quoted above are indeed clearly to be understood as an instance of a razor reasoning, as the sections that follow and that conclude the *Principles* make crystal-clear:

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[52] *Principia* IV 198; AT VIII-1 322, 11- 323, 2; CSM I 285* (emphases added). The passage in angle brackets is taken from the French authorized translation (AT IX-2 317), and makes crystal-clear that Descartes is not thinking of color-properties as dispositions in the current metaphysical sense of the term, but as different *arrangements* of the body's particles, where *dispositio* is clearly to be taken in a spatial and geometrical sense. The "disposition" of the particles in this sense was indeed one of the key explanatory principles of atomism, which Descartes is clearly reworking, despite denying the existence of void and of indivisible particles – the atoms – which are replaces in his account by infinitely divisible (at least in principle) corpuscles. For Descartes' own understanding of the relation between his philosophy and atomism (we he tried his best to deny as much as possible for both "political" reasons and purely philosophical ones) see *Principia* IV 202; AT VIII-1 325, 3-27.

[53] See the entire last chapter of Peter Machamer – James E. McGuire. *Descartes's Changing Mind* (Princeton, NJ: Princeton University Press 2009).

> No one who uses his reason will, I think, deny that is by far preferable (*longè melius sit*) to understand of what happens in tiny bodies which elude our senses merely because of their small size on the model of what we perceive thought our sense in large bodies, than explaining it by concocting some unknow new entities (*novas res nescio quas… excogitare*).[54]

It is for this reasons that in these same sections of the *Principles* Descartes took care to qualify the claim that "light, color, smell, taste, sound and tactile qualities are nothing but certain dispositions of the body's particles consisting in size, shape and motion" with a crucial remark: "so far as we can see" (*nihil aliud esse, vel saltem à nobis non deprehendi quicquam aliud esse in objectis, quàm…*).[55] Descartes also pointed out that "we cannot understand how real qualities and substantial forms could have the power the set in motion other bodies" – thereby setting into motions the nerves and making the perceiver perceive.[56] Still, such an impossibility for us to understand how a non-corporeal entity could set into motion a corporeal one was not for Descartes an argument to deny the existence of the non-corporeal entity under question: would this have been the case, one would indeed have had to rule out also the action of the mind on the body in our own case, as well as the very possibility for God to act upon the material world.

"Although I regard it as established that we cannot prove there is any thought in animals, I do not think it can be proved that there is none, since the human mind does not reach into their hearts".[57] In the case of material substances too for Descartes their "heart" – would they have any – lies beyond our sight. If an Aristotelian was to insist that Descartes had not proven once and for all that there were not real qualities and substantial forms in nature, Descartes would have granted that he was fully right. He would also have insisted, though (as he did with More in the case of non-human animals' minds) that "he regarded it as certain and demonstrated that we cannot at all prove the presence of a thinking soul in animals". That is, *mutatis mutandis*, "that there is no phenomenon in nature" of which he thought he had not provided an explanation by appealing to anything but the size, shape and motion of bodies.[58] This is all we can tell, but

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[54] *Principia* IV 201; AT VIII-1 324, 26 - 325, 2; CSM I 287*.

[55] *Principia* IV 199; AT VIII-1 323, 9-13; CSM I 285*.

[56] *Principia* IV 198; AT VIII-1 322, 18-29; CSM I 285*. Descartes in the same passage expresses a related concern in the opposite direction, wondering how these forms could be meaningfully said to have been brought about by material objects; for more on Descartes' criticism of the Aristotelian concept of an *eductio a materia* of forms, see §17 above.

[57] To More, 5 February 1649; AT V 276; K III 365.

[58] So reads the title of *Principia* IV 199.

according to Descartes there also remains nothing to be told. Descartes' opening decision "to begin from the mind" and to move from there to the world casts its light from the first pages of the *Meditations* to the very last sections of the *Principles*. Descartes' razor is not the outcome of having adopted a purely epistemological stance by a skeptical man in his late forties no longer concerned with the reality of things but only with what he thought to know about them. According to Descartes, in accordance with the phenomenological starting point of this inquiry, what things truly are can indeed be established only from what the subject knows of these things: from his ideas of these things, from his reasoning about them, from how his theories concerning what these things are and how they behave come together to compose an articulated system of reasons, some of which grounded on first, some others on natural philosophy.

In order to posit any additional entity, in order to locate a non-corporeal substance in the heart of non-human animals and things, this is what was required for Descartes: a reason. And "no one who uses his reason", according to Descartes, would have ever insisted to posit entities only because nothing prevented him from doing it. Descartes' real concern in claiming that bodies are nothing but extended substances was not only to adopt without need a less austere metaphysics. What he found truly repugnant was that a rational being could insist on making an unwarranted claim for the sake of the argument alone. Descartes though to have proven thanks to his first and his natural philosophy that the burden of proof has shifted from the deniers to the advocates of substantial forms and real qualities, as he thought to have demonstrated that no proof in favor of the existence of like entities – or of kindred ones such as the animal soul – could ever be provided by his opponents: Descartes affirmed that he had in fact accounted for *all* natural phenomena other than language without ever appealing to anything but geometrical properties and the laws of motion. A far-fetched claim, indeed, which will turn out be problematic already during Descartes' lifetime, and false shortly after. And yet, even after four centuries, Descartes' positive and sanguine confidence in the "natural power of our native intelligence" and his insisting demands for *reasons* in any field of human knowledge makes his philosophy still worth admiring, and studying.

Appendix

Larvatus prodeo – The argumentative strategy of Descartes' earlier works

In introducing this work, it has been made clear that its intention was not to reconstruct the evolution of Descartes' theory of bodies from his early writings till the end of his life. This work aims in fact at accounting for Descartes' "mature" theory only, from the *Essay* onwards. The writings traditionally dated before 1637 have accordingly been (almost) exclusively considered insofar as they permitted to cast light on Descartes' mature views. The qualification "traditionally dated" is in order: as pointed out, the chronology of the *Rules* and the *World* is indeed especially problematic, and cannot be properly addressed anew until the newly-found and alternative manuscript of the *Rules* will be edited (which, hopefully enough, will happen after much waiting already next year). Some scholars suggested that the *Rules* as we know them would have in fact been completed by Descartes between 1637 and 1640, and should according count as a "mature" work. In §24 I presented arguments based on the evolution of Descartes' view in physiology against this claim, but a proper assessment of the matter will of course have to wait the publication of the so-called *Ur-Regulæ*. The *World* too – and, more specifically, the *Treatise on Man* – seems to have undergone some reworking during the 1640s, especially as far as the theory of vision in concerned (see the next chapter). The opening pages of the *Treatise on Light* seem on the other hand to have been truly written in the early 1630s, and predate without any doubt the *Essais*. The question how significantly the theory of bodies presented in that treatise differs from the one presented in 1637 is a matter of debate among scholars: someone like Hattab called from a radical change in Descartes' views, some others, like Schmaltz, have on the other hand (and to my eyes, fully convincingly) argued for a fundamental continuity of Descartes' views on the issue.[1] The question is tricky, and would deserve almost another work to be addressed appropriately.

Descartes' argument that the essence of bodies consists in extension underwent indeed some all-important changes during the years (see again §12). More specifically, during the 1620s and the '30s Descartes argued for the distinction between *two* classes of ideas of bodies – extension and figure on the one hand; light and color on the other – on quite different grounds. In the *Rules* Descartes appealed in fact to the received Aristotelian distinction between two

[1] Helen Hattab, *Descartes on Forms and Mechanism* (Cambridge - New York: Cambridge University Press 2009). Tad M. Schmaltz, "Review Essay: *Descartes on Forms and Mechanisms*, by Helen Hattab, and *Descartes's Changing Mind*, by Peter Machamer and J. E. McGuire", *Oxford Studies in Early Modern Philosophy* 6 (2012): 349-72.

classes of *sensibles*, the proper and the common ones, further complicated by a reference to his early doctrine of the "simple" notions. In the *Rules* Descartes defended in fact the phenomenological priority of shape over color on the basis of the claim that "the concept of shape is so simple and common to be implicit in every sensibles".[2] In his later writings, on the other hand, although still defending the distinction between proper and common sensibles, Descartes no longer assigned any foundational role thereto, and turned to other phenomenological criteria in order to draw the intended distinction between two classes of ideas of bodies. In the 1633 *Treatise* Descartes seems moreover to rework the argument of the *Rules* in relation to the faculty of the imagination, claiming that the idea of extension is somehow "comprised" in everything we can imagine, arguing on this basis for its priority over all other ideas of material objects.[3] The passages from the *Rules* and the *World* are however too brisk to make much too much out of them: Descartes underwent the writing of the *Meditations* precisely because he himself realized that these claims required to be properly justified. The sophistication of the taxonomies of ideas presented in the *Meditations*, some of which had never been mentioned (and most probably, not even envisaged) by Descartes in his previous writings had indeed shown how markedly Descartes' argument that the essence of bodies consists in extension improved in slightly more than a decade.

Some interpreters have argued that the differences between the *Rules to the Direction of the "Ingenium"* and the *Meditations on First Philosophy* are in fact even deeper, inasmuch as in the early work Descartes would have remained studiously silent on metaphysical issues. Metaphysics would accordingly be absent from the work, or only "grey" (to use Marion's famous expression).[4] The virtual identity in phrasing of the *Regulæ* with Descartes' writings of the 1630s and '40s (already documented in detail as far as the theory of perception is concerned) would according to some scholars be in fact no reason enough to have these works discussed alongside. They object that in the *Rules* Descartes did indeed put forth these claims only tentatively. Even more to the point, some interpreters have argued that in his first major work Descartes was adopting a purely "methodological stance", not really concerned about the way the world happens to be. For how much the letter of the *Rules* and of Descartes' later, more "assertive"

[2] *Regulæ* XII; AT X 413, 7-8; CSM I 41*.

[3] *Le Monde* 6; AT XI 35, 12-14; CSM I 91: "Et pour la matière dont je l'ai composé, il n'y a rien de plus simple, ni de plus facile à connaître dans les créatures inanimées; & son idée est tellement comprise en toutes celles que notre imagination peut former, qu'il faut nécessairement que vous la conceviez, ou que vous n'imaginiez jamais aucune chose".

[4] Jean-Luc Marion, *Sur l'ontologie grise de Descartes* (Paris: Vrin 1993²).

and metaphysically committed writings could indeed sound the same, the spirit (it is claimed) would in fact be completely different.[5]

Admittedly, in the *Twelfth Rule* – the most important one for the issues at stake – Descartes introduces most of his statements as mere *suppositiones*, whose helpfulness in elucidating the matter does not necessarily imply their being true. The reader is however hardly fooled by Descartes' guarded statements, since Descartes himself expressly affirms (just a few lines before introducing his quite long list of "assumptions") that the only reason why he is taking as his starting point a few assumptions is that, at present, he could not lay out a rigorous demonstration thereof (which he thought nonetheless to be already in possession of):

> I would like to explain at this point what the human mind is, what the body is and how it is informed by the mind, what faculties within the composite whole promote knowledge of things, and what each particular faculty does. But I lack the space, I think, to include all the points that have to be set out before the truth about these matters can be made clear to everyone. For I want always to write in such a way that I make no assertions apt to give rise to controversy, without first setting out the reasons which led me to make them and which I think others may find convincing too.
>
> But since I cannot do that here, it will be sufficient if I explain as briefly as possible what, for my purposes, is the most useful way of conceiving everything within us which contributes to our knowledge of things (*quisnam modus concipiendi illud omne, quod in nobis est ad res cognoscendas, sit maximè utilis ad meum institutum*). Of course, you are not obliged to believe that this is actually the case. But what is to prevent you from following these suppositions if it is obvious that they detract not a jot from the truth of things, but simply make everything clearer?[6]

The "assumptions" of the 1628 *Regulæ* are clearly on a par with the "assumptions" of the 1637 *Essais*. It would be actually quite naïve to take the claims of the *Regulæ* as some useful hypotheses among the many, and only readers with too innocent eyes can fail to appreciate the metaphysical vigor of statements such as "the power through which we do properly know things is purely spiritual (*vis pure spiritualis*), and is not less distinct from the whole body than blood from bone, or the hand from the eye" simply because of a fig leaf that covers them up as mere hypotheses.[7] Indeed, as the passage just quoted attests, dualism too (although quite probably a not very worked-out version of it) was advocated by Descartes already in the late 1620s, and

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[5] See, for example, the already mentioned Peter Machmer – J. E. Mc Guire, *Descartes' Changing Mind*. The radical evolution thesis defended in this book – in that case as far as Descartes' conception of innatism was concerned – has already been contested in §4.

[6] *Regulæ* XII; AT XII 411, 17- 412, 10; CSM I 39-40*.

[7] *Ibid.* AT X 415, 13-16; CSM I 42*.

with it the resultant metaphysical – as opposed to a merely heuristic or methodological – distinction between a physical and a mental stage of the perceptual process. Descartes' main reason for putting forward his metaphysics and his physio-psychological theory only as a sort of pleasing and useful fable, as he will do a few years later for his cosmography, was to make it more palatable to strict Aristotelians by playing down its seriousness and its implications. *Quid igitur sequetur incommodi*, Descartes asks the reader, in case he would follow him and his suppositions for a little while? Which troublesome consequences could there ever be?[8] Quite a few, actually, and Descartes was keenly aware of it.

The first assumption Descartes asks his reader to make is indeed that the external sense-organs are modified only insofar as the configuration of their parts is modified, providing as the first example of this claim the case of vision, on which much has been said in the previous chapters. Descartes reassures his reader that he should not hesitate in front of the claim that "the first opaque membrane of the eye received the shape impressed upon it by multi-colored light". It is only a supposition, in the end, so that "the consequences of this supposition [cannot be] falser than those of any other". There are moreover, Descartes argues, good reasons to favor this one supposition among any others, which comes from the consideration of how our sensory ideas relate (from phenomenology, that is to say):

> Nothing is more readily perceivable by the senses than shape, for it can be touched as well as seen... This is demonstrated by the fact that the concept of shape is so simple and common that it is involved in everything perceivable by the senses. Take color, for example: whatever you may suppose color to be, you will not deny that it is extended, and consequently has shape. So what troublesome consequences could there be if – while avoiding the useless assumption and pointless invention of some new entity, and without denying what others have preferred to think on the subject – we simply make an abstraction, setting aside every feature of color apart from its possessing the character of shape, and conceive of the difference between white, blue, red, etc., as being like the difference between the following figures, or similar ones?[9]

[8] *Ibid.* AT X 413, 11; CSM I 41*. Analogously at 412, 7-8: "Sed quid impediet quominus easdem suppositiones sequamini?"

[9] *Regulæ* XII; AT X 413, 3-17; CSM I 40-41*: "Atque hæc omnia ita concipere multùm juvat, cum nihil facilius sub sensum cadat quàm figura: tangitur enim & videtur. Nihil autem falsum ex hac suppositione magis quàm ex aliâ quâvis sequi, demonstratur ex eo, quòd tam communis & simplex sit figuræ conceptus, ut involvatur in omni sensibili. Ver. gr., colorem supponas esse quidquid vis, tamen eumdem extensum esse non negabis, & per consequens figuratum. Quid igitur sequetur incommodi, si, caventes ne aliquod novum ens inutiliter admittamus & temere fingamus, non negemus quidem de colore quidquid aliis placuerit, sed tantum abstrahamus ab omni alio,

As it will be the case with the *Essais*, Descartes seems here to be opposing his theory that the only properties of bodies are extension and related modes (most notably of all, figure) and the Scholastic understanding of colors in terms of real qualities as a clash between "suppositions": one more parsimonious, the other overabundant to be point of resulting "pointless" if not plainly "inconsiderate" (this probably being the term that better captures the meaning of *temere* in the passage just quoted). What has been said before makes however clear that Descartes took himself to have a *proof* in favor of the claim that sense-organs are indeed impressed only by the patterns of motion, and can only transmit patterns of motion to the brain via the nerves (this being the subject-matter of the following "suppositions"). Descartes thought moreover to have arguments in favor of the much more demanding claim that the essence of bodies consists in extension and differs from the mind no less than "a hand from the eye". One can of course only speculate about what kind of proof Descartes thought he had, but the crucial point is that Descartes believed he had one, for how much unsophisticated compared to the one presented in the *Meditations*. If Descartes' argument from 'first philosophy' of the late 1620s remains a matter of speculation, the *Rules* are on the other hand clear that already a that time Descartes understood of his argument against real qualities – as well as substantial forms – in terms of a razor. Descartes urges in fact that the main advantage of the theory he is presenting is that it avoids to "posit without necessity (*inutiliter*) some new entity", which is precisely the point he will make in the *Essais*, the *Meditations*, and the *Principles*. Although couched in the terms of a clash between competing "suppositions" the *Rules* seem indeed to suggest that already in the late 1620s Descartes understood of his argument that bodies are nothing but extended substances as an argument from parsimony on the top of a phenomenologically-grounded theory that the essence of bodies consists in extension, to be presented (out of "convenience") as an "assumption".

This interpretation of the *Rules*, together with what has been said before concerning the *Essais*, show that Descartes' texts cannot be invariably taken at face value. This is especially true for the *Rules*, but these warnings ought to be extended to all of Descartes' writings. The attested shortcomings of a purely "literalist" approach have however led some interpreters to argue for the opposite claims, following Descartes' advice that one should no longer trust what has deceived him in another occasion. Such a reading, pushed too far, engendered to so-called "radical dissimulation" thesis, according to which Descartes would have been an atheist in disguise who, among the other things, would have cunningly devised some badly faulty

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quàm quòd habeat figuræ naturam, & concipiamus diversitatem, quæ est inter album, cœruleum, rubrum, &c., veluti illam quæ est inter has aut similes figuras, &c.?".

arguments in favor of God's existence in order to support the reverse claim, thereby bypassing the censorship.[10] The dedication to the Sorbonne, in their view, would have thus been an almost devilish masquerade, in the manner of Mephistopheles taking on Faust's guise to get rid of an unwelcomed student and of his inclination for theology. One could indeed be tempted to agree with Hobbes that this is quite the case as for Descartes' claims about the Eucharist are concerned, which the irony of history wanted to be the excuse of Descartes' opponents for having his works put on the *Index* in 1663.[11] So wary a reading, however, is evidently been led astray by the sin opposite to the unrestricted literalist one. Its unmitigated adoption eventually results in a new version of the deceiving demon doubt, as difficult to rule out as the original one in the lack of a trustworthy guarantor.

As the detailed analysis of many passages from virtually all of Descartes' writings presented in the course of this work should have made clear enough, the clear majority of Descartes' arguments are indeed genuinely philosophical, and should therefore be evaluated according to rational standards rather than relegated to sheer rhetorical devices. They are, nevertheless, the arguments of a not very brave fellow that understandably enough dreaded censorship, possibly even prison or death (think of Vanini; Arnauld will only be luckier), and who was leading a lifelong cultural war against mightier enemies from whom he had learnt, in his youth, the subtle art of expressing himself obliquely. Descartes' juvenile and unfortunately lost booklet *On Fencing* is likely to have recommended feigns of an analogous sort to defeat the attacker. Among Descartes' first extant words, the motto *larvatus prodeo* ("masked I go forward"), perfectly conveys his attitude in composing the main part of his writings – hence the crucial importance of some of Descartes' most private letters – and challenges the interpreter to uncover their true face, hidden behind a thick veil of intended ambiguities, *videtur* and faint hints.[12] Some of his contemporaries expressly blamed Descartes for this attitude, actually, as for example did Jacobus Revius in his *Statera Philosophiæ Cartesianæ* (1650), where he complained that no philosopher ever used vague words such as "supposing", "hardly" or "perhaps" more frequently than the author

[10] The most extreme defender of this reading is likely to have been Maxime Leroy, *Descartes, le philosophe au masque* (Paris: Rieder 1929). On the issue see, more recently, Louis E. Loeb, "Is There Radical Dissimulation in Descartes' *Meditations*" in Amélie Oksenberg Rorty ed., *Essays on Descartes'* Meditations (Berkeley - Los Angeles - London: University of California Press 1986), 243-70.

[11] On Descartes' alleged dissimulation as being only in the eyes of the reader, see Francesco Orlando, *Illuminismo, barocco e retorica freudiana* (Torino: Einaudi 1997), 137-45.

[12] Cf. *Cogitationes privatæ*, AT X 213, 4-7: "Ut *comoedi, moniti ne in fronte appareat pudor,* personam induunt: sic ego, hoc mundi theatrum conscensurus, in quo hactenus spectator extiti, larvatus prodeo" (dated 1st January 1619).

of the *Meditationes*.[13] The point, however, is not so much to make Descartes a hero, a victim or, at the opposite, to condemn his pusillanimity, but rather to take cognizance of the historical context in which he operated and composed his works.

Descartes, as a matter of fact, made use of discretion not only as an instrument of defense, but also as an artful weapon against his enemies, hiding under the allure of his prose the venom of the argument. The *Mediationes*, to mention the most striking instance of this demeanor, were indeed studiously conceived by Descartes as a poisoned apple for Aristotelians. Another striking example comes from the *Rules* passage quoted above, where Descartes appeals to the distinction between proper and common sensibles, shared by most, if not all, of his opponents. Descartes makes use of it as a red herring for Aristotelians and as a *Trojan horse* to be sent behind their lines, asking for their assent. A*s soon as he has obtained it, though – or so, at least, he hoped – Descartes* turns the theory on its head and such an orthodox piece of Aristotelian philosophy into an argument in favor of his own, to force his readers, as it were, to go Cartesians by their own hands. The very same strategy features almost twenty years later in the *Principia*, there too under false pretenses, as the allegedly obvious answer to what presents itself as a rhetorical question.[14] In order to unravel the manifold strands of the text and to track down the proper thread of the reasoning, the interpreter's task is hence to brush the thick texture of Descartes' writings "against the nap" (*gegen den Strich zu bürsten*).[15] Admittedly, there are no universal procedures or even only general criteria whose painstaking application could enable the reader to figure out the true intentions of an author in writing down his thoughts. All an interpreter can do is to give ear to the texts, tapping on the surface of the words, as a luthier on the wood, to check if they sound hollow.[16] Descartes' pretension that the *Regulæ* only dealt with a handful of useful and harmless *suppositiones* should thus ultimately be taken for what literally is: an understatement, and an argumentative stratagem. Descartes was confident that the most sensitive of his readers of the time would however have immediately understood the logic of his argument. And so better can we today, who have access to a greater number of Descartes' works, some of which private.

We do not know why Descartes decided to abandon *Rules* just a few propositions before

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[13] Revius, *Statera Philosophiæ Cartesianæ* (Leiden: Leffen 1650), 15-20; the passage is discussed by Theo Verbeek, *Descartes and the Dutch: Early Reactions to Cartesian Philosophy, 1637-1650* (Carbondale - Edwardsville: Southern Illinois University Press 1992), 79.

[14] *Principia IV 200; AT VIII-A 323, 25 - 29: "Quis autem unquam dubitavit...?"*

[15] Walter Benjamin, famously enough, spoke of the necessity "die Geschichte gegen den Strich zu bürsten" in the seventh of his theses *Über den Begriff der Geschichte*.

[16] I am reworking here the celebrated metaphor which opens Marc Bloch's *Apologie pour l'Histoire*.

their intended conclusion and, accordingly, never to publish them. This too is another topic much debated by scholars that cannot be entered now, also because it seems to depend to a good extent on a change in Descartes' understanding of mathematical sciences. The reasons why he abandoned the publication of the *World* are on the other hand already been presented, so that there is no need to linger any longer thereon. In order to conclude this analysis of Descartes' argument that bodies are nothing but extended substances as presented in the writings before the *Essais*, it is however important to point out that at the beginning of the *World* Descartes states as clearly as possible that in the course of the treatise we will never appeal to the "junk of Scholastic entities" inasmuch as he thinks they are not needed to his explanation. Descartes' appeal to the principle of ontological parsimony is actually even more explicit than in the *Rules*, and at the beginning of the *World* Descartes presents it in clear opposition to the argument in favor of bodies' being extended. If there could still be doubts about whether Descartes in the *Rules* already conceived of his theory about the nature of bodies as grounded on a *two-step* argument, like concerns do not apply to the *World*.[17] Already in the early 1630s Descartes had indeed laid out the basics of a reasoning that, although much reworked, improved and qualified during the years, he will never abandon till the very end of his life:

> When flame burns wood… we can see with the naked eye that it sets the minute parts of the wood in motion and separate them from one another, thus transforming the finer parts into fire, air, and smoke, and leaving the coarser parts as the ashes. Others may, if they wish, imagine the "form of fire", the "quality of heat", and the "action of burning" to be completely different things in the wood. For my part, *I am afraid of mistakenly supposing there is anything more in the woo than what I see must be necessarily be in it*, and so I am content to limit my conception to the motion of its parts. For you might posit "fire" and "heat" in the wood, and make it burn as much as you please: but if you do not suppose in addition that some of its parts move about and detach themselves from their neighbors, I cannot imagine it undergoing any alteration of change.[18]

Although starting from the specific case of fire, it takes indeed only a few pages for Descartes to make clear that he took the same to be the case for *all* bodies, they all being constituted by the same elements and these elements, in turn, having none of the qualities traditionally ascribed to them by the Scholastics:

[17] How to interpret the "fable" put forward by Descartes in *Le Monde* has already been made clear in §20.

[18] *Monde* 2; AT XI 7, 8 - 8, 2; CSM I 83*.

> If you find strange that in explaining these elements I do not sue the qualities called "heat", "cold", "moisture" and "dryness" – as the philosophers [of the Schools] do – I shall say to you that these qualities themselves seem to me to need explanation. Indeed, unless I am mistaken, not only these four qualities, but all the others as well, including even the forms of inanimate bodies, *can be explained without the need to suppose anything in their matter other than* the motion, size, shape, and arrangement of its parts.[19]

Turn this *Appendix* into an articulated story concerning the early stages of Descartes' theory of bodies and its evolution over the years would of course require a chapter if not a book of its own, which I hope I will be able to provide in the next future. The interplay between what are traditionally referred to as *logic of justification* and the *logic of discovery* is indeed especially tricky in the case of Descartes' argument that bodies are nothing but extended substances, first of all because it is quite hard to reconstruct Descartes' views on the issue during the 1620s and early '30s, all the more until a firm chronology of Descartes' earlier works has not yet been established. The pieces of evidence provided in the course of this second part of the work should however have shown that it was by reflecting of the theory of perception, and more precisely of vision, that Descartes started calling into question the Aristotelian theory of *species*, real qualities and substantial forms. The interplay between optics, psychology and physiology (what Schuster called the "o-p-p nexus") was not in fact only intended by Descartes to "guarantee the truth and reference of universal mathematics".[20] This was undeniably one of Descartes' crucial concerns of the *Rules*, but Schuster himself recognizes that according to Descartes this "nexus" provided much more: it would provide, indeed, "a systematic new account of perception, mental function and knowledge"[21]. Schuster was fully right about this point, which he has however ended up downplaying inasmuch as he thought that Descartes "was not yet fully aware of the deep epistemological puzzles latent in his mechanistic account

[19] *Monde* 5; AT XI 25, 25 - 26, 8; CSM I 89. In the follow-up of the same passage Descartes speaks nonetheless of the "forms of the elements" to refer to the geometrical properties of the three kind of particles that, in his views, count as the elementary ones. It is on the basis of passages like this that Hattab, in her book mentioned shortly before, has suggested that Descartes was still committed in the *World* to a (albeit much mitigated) form of hylomorphism. Schmaltz has however convincingly argued that one should be careful not to read too much in the expression " form of the elements", and that the *World* – just think of the passage just quoted – seems to leave no doubt that Descartes has rejected already at that stage the metaphysical framework of hylomorphism, in spite of retaining part of its vocabulary (it remains unclear whether as a matter of habit or, how it is more likely the case, to cast his theses in terms more comprehensible or, at least, habitual to his audience).

[20] John Schuster, *Descartes' Agonistes: Physico-mathematics, Method & Corpuscular-Mechanism, 1618-33* (Dordrecht: Springer 2013), 327.

[21] *Ibid.* 333.

of perception, and in the unarticulated dualism of his account of mental function".[22] The current and previous chapters have however been intended to prove that this is in fact far from being the case: although Descartes does in fact spell out no *arguments* in favor of the claim that mind and body are distinct and remains therefore hard to figure out how he intended to articulate this metaphysical theory, (a form of) dualism is undeniably at work in the *Rules* and is expressly defended by Descartes, who claimed as explicitly as possible that "the power through which we do properly know things is purely spiritual (*vis pure spiritualis*), and no less distinct from the whole body than blood from bone, or the hand from the eye". Schuster himself, as a matter of fact, speaks indeed elsewhere of an "embryonic dualist metaphysics" and of "an embryonic ontological dualism lay[*ing*] behind the justificatory machinery of the later *Regulæ*".[23] As shown in §24, the account of perception put forward by Descartes in the *Rules* is moreover to be understood as a clear response to Kepler's difficulties concerning the transmission of the retinal image, who has already pointed out that the issue at stake was not a mere physiological affaire but had far-reaching epistemological implications. Descartes was fully aware of the implications of the account he was presenting, for how much it remains hard to figure out how he intended to make sense of them, this being probably one of the goals he set for himself in the (unfortunately lost) treatise in metaphysics he wrote the months after having abandoned the *Rules* – in case the standard chronology is to be trusted.

As far as the claim that bodies do not have the color qualities usually ascribed to them by the Aristotelians are concerned, the crucial feature of Descartes' account of perception is not indeed to be "mechanistic" in nature (as Schuster puts it, and as much insisted before him by Crombie), but to have ruled out the transmission of colors from the eye to the brain as the Perspectivists understood of it, thereby paving the way to an argument that would have eventually led to deny colors-qualities to bodies.[24] Schuster's book has the great merit of reading the *Rules* and Descartes' early writings in their own terms, as it were, without illegitimately projecting back to the writings of the 1620s and early '30s Descartes' "mature" views. Schuster has however pressed his interpretative strategy quite too far, to the point of claiming that the author of the *Rules* would have been by and large unaware of the philosophical problems

[22] *Ibid.* 319.

[23] *Ibid.* 353.

[24] Alistair C. Crombie, "The mechanistic hypothesis and the scientific study of vision", *Proceedings of the Royal Microscopical Society* 2 (1967): 3-112; reprinted in Id., *Science, Optics and Music in Medieval and Early Modern Thought* (London: Hambledon 1990).

connected to the account he was presenting, whose sudden discovery would have led him to abandon the work before its intended conclusion:

> By mechanizing Kepler's theory of vision and building the o-p-p nexus, Descartes went so far in pursuit of his methodological and legitimatory goals that he *unintentionally* actualized the *latent* epistemological difficulties of his assumed and as yet unexplicated dualism of *vis cognoscens* and material brain loci in a way, and in a context, in which they could hardly be ignored. After dropping the *Regulæ* in 1628, Descartes moved to meet these problems and in so doing *unwittingly* began to work on lines that led to his prominent but elusive place in modern philosophy…[25]

The part of this work which is going to conclude has however extensively argued that Descartes' account of the perceptual process was intended right from the beginning as something more than a justification of Descartes' reliance on bi-dimensional diagrams in mathematical practice. The survey of the *Rules* and the *World* presented in this *Appendix* should moreover have shown that Descartes' two-step argument to deny to material object any properties other than geometrical properties is not only an essential piece of Descartes' mature philosophy, but also of his early reflections on the topic. It might well be the case that the argument painstakingly presented in this work is not just an argument among the many worked out by Descartes during the years, but the *Leitfaden* that unifies works that have apparently virtually nothing in common, such as a booklet on the direction of the mind and a four-volume treatise for the schools, a treatise on the nature of light and some meditations on first philosophy. Descartes' two-step argument that bodies are nothing but extended substances could indeed turn out to be the keystone of Descartes' entire philosophy.

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[25] Schuster, *Descartes' Agonistes,* 340 (emphases added).

§27. The "natural geometry" of vision and the nature of bodies

At first, the claim made at the beginning of this work that vision theory plays a paramount role in Descartes' account of the nature of bodies should have sounded to a reader conversant with the literature on Descartes as a pretty old one. As it should go without saying, the thesis defended in this work that Descartes appealed to the dissimilarity between the physiological stimulus and the resulting sensation (the key feature of the *second* stage of the visual process) to argue that bodies are *nothing but extended* substances is not however to be confused with the claim that Descartes would have appealed to the *third* and last stage of the visual process (the cognitive stage) to argue that bodies are *extended*. To come back to a key text already presented in introducing this section of the work, in the *Sixth Replies* to the *Meditations* Descartes distinguished in fact between *three* stages of the visual process: a first purely physiological stage, and two mental ones. Descartes further articulated in fact the mental step of the visual process into two stages: one to be attributed to sensibility, the other to the understanding:

> To the first stage pertains only the immediate affection of a bodily organ by external objects, which cannot be anything but a motion of the particles of this organ, and the change in shape and position resulting from this motion. The second stage comprises what immediately results in the mind because of its being united with a bodily organ which is affected in this way. These are the sensations of pain, pleasure, thirst, hunger, color, sound, taste, smell, heat, cold and the like, which arises from the union and as it were the intermingling of mind and body… The third stage includes all the judgments about things located outside us which, occasioned by these motions of a bodily organ.[1]

Descartes spelled out more in detail his model of the visual process by considering the perception of a specific body that, in the light of what has been said in the previous chapters, we are finally in a position to appreciate in full (at least as far as the two first stages of the process are concerned):

> For example, when I see a stick, it should not be supposed that certain so-called *species intentionales* fly off the stick toward the eye, but simply that rays of light are reflected off the stick and set up certain movements in the optic nerves and, via the optic nerve, in the brain, as I have sufficiently explained in the *Dioptrics*. And it is in this movement of the brain, common to us and the brutes, that the first stage

[1] *Responsiones* VI; AT VII 436, 26 - 437, 11; CSM II 294-95*.

> of the perceptual process consists.[2] This is followed by a second stage, which only extends to the perception of the color and light reflected from the stick; it arises from the fact that the mind is so intimately conjoined with the body that it is affected by the movements occurring in it. Nothing more than this should be referred to sensibility (*sensus*), if we wish to distinguish it carefully from the intellect. But supposed that, as a result of being affected by this sensation of color, I judge that a stick, located outside me, is colored. And suppose that on the basis of the extension of the color and its boundaries together with its position in relation to the parts of the brain, I make a rational calculation (*ratiociner*) about the size, shape and distance of the stick: although such reasoning is commonly assigned to the senses – which is why I have here referred it to the third grade of *sensory* response – it is clear that it depends solely on the intellect. I demonstrated in the *Dioptrics* how size, distance and shape can be perceived by reasoning alone, which works out any one feature from the other features.[3]

The distinction between a non-cognitive and a cognitive stage of the visual process dates back to Antiquity: if already Ptolemy believed that the perception of color simply resulted from a coloring of the sentient visual organ, he argued that the perception of other features such as shape and the like required on the other hand a *cognitive process*. Already Aristotle, as already pointed out, distinguished between two classes of sensibles – and, hence, of visibles – the proper and the common ones. In none of his writings had nonetheless Aristotle ever drawn a distinction between the *process* through which common sensibles are apprehended and that through which proper sensibles are. In fact, he treated these two classes as essentially on a par, so that it seems safe to conclude that, in Aristotle's eyes, there was no difference at all between the manners in which proper and common sensibles are apprehended. Or, at least, we may conclude that if Aristotle did consider there to be any difference here, he thought it negligible enough to simply pass over it in silence.[4] Although Aristotle too claimed at one point that

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[2] By saying that this stage is common to human and non-human animals Descartes intends to point out that, as long as nothing but the purely physiological stage is concerned, is irrelevant whether to the body's organs where these changes take place is attached a mind or not – i.e. whether the being in question is sentient or not. But since Descartes thinks to have shown that the entire behavior of non-human animals can be accounted for in purely mechanical terms, he concluded that there are no arguments to credit non-human animals with perception (and, thus, with the following stages of the process – the *mental* ones); for more on the topic, see before §20.

[3] *Responsiones* VI; AT VII 437, 12 - 438, 4; CSM II 295*.

[4] See Richard Sorabji, "Body and Soul in Aristotle", *Philosophy* 49 (1974), 49 n. 22. Id., "Intentionality and Physiological Processes: Aristotle's Theory of Sense-Perception" in Martha C. Nussbaum – Amélie Oksenberg Rorty eds., *Essays on Aristotle's* De Anima (Oxford: Clarendon Press 1992), 196-97, 209. For all these reasons, I think that Smith overstates the similarity between Ptolemy's and Aristotle's account of the visual process, so that his criticism of Lejeune for having neglected the "all-important distinction between primary and secondary visibles" backfires against him: cf. A. Mark Smith, "The Psychology of Visual Perception in Ptolemy's Optics", *Isis* 79/2

common sensibles are perceived "accidentally" (κατὰ συμβεβηκός) by each specific sense, he had also insisted that they are perceived, nonetheless, *per se* (καθ᾽αὑτά) by sensibility, so that his ultimate conclusion remained that there existed a "common sense" above and beyond all particular ones.[5] Ptolemy, on his part, argued that visibles other than color are only "secondarily" visible (*videntur sequenter*). As a matter of fact, he devoted a substantial portion of his work precisely to spelling out the *cognitive operations* that the perceiver must perform in order to apprehend the object's size – as well as all other common sensibles – from the differences in light and color that he is presented with. He argued, for example, that "the differences in the size of objects are apprehended according to the differences [in the size of] the corresponding visual angles", painstakingly working out the geometrical principles and theorems which would underlie this perceptual process.[6]

This disparity in the perception of the proper and of the non-proper visibles is not, however, a direct consequence of Ptolemy's specific (and extramissionist) theory of vision, but results from some real difficulties in accounting for the perception of size and similar visible features that are not to be found in the case of light and colors. All of the difficulties pointed out by Ptolemy apply in fact also to any intromissionist model. Alhacen, as a consequence, was able to accept the framework of Ptolemy's account of the perceptual process even while replacing Ptolemy's *visual* rays issuing from the eye with *light* rays entering into it. Alhacen's model was, moreover, to face some additional difficulties as far as distance-perception is concerned, since in this case the perceiver could be taken to sense distance by means of the perceived length of the visual rays emanating from his eyes.

Developing Ptolemy's account, Alhacen and Bacon and all the Perspectivists came therefore to distinguish between two sets of visible features according to how they come to be apprehended: on the one hand light and color, on the other all the common sensibles of the

(1988), 201, n. 29. Smith, more generally, sees a deep continuity between Aristotle, Ptolemy and Alhacen as regards the theory of the non-proper sensibles, despite Sabra's apt cautions to keep them distinct; see, respectively, Smith's (538-41) and Sabra's (II 83) editions of Alhacen.

[5] See, respectively, *De anima* Γ 1, 425^{a}16 (to which is to be added Γ 3, 428^{b}25) and B 6, 418^{a}7-20. The correct interpretation of these passages – and of the related ones in the *Parva naturalia* – has been a matter of dispute for centuries; for a critical overview of the main positions, see Joseph Owens, "Aristotle on Common Sensibles and Incidental Perception", *Phoenix* 36 (1982): 215-36. According to Aristotle the true opposition seems, at any rate, to be the one between proper and common sensibles on the one hand and, on the other, what he designates simply as the sensibles κατὰ συμβεβηκός, such as perceiving that the white thing in front of me is, for example, the son of Diares; cf. *De anima* B 6, 418^{a}7-26.

[6] Ptolemy, *Optica* II 52; Smith 92.

Aristotelian tradition (as well as many other features such a distance, "corporeity", continuity and so forth). As already shown in detail in §21, according to the Perspectivists the perception of the proper sensibles does in fact require no cognitive operations: "Light and color", they claimed, "are apprehended by naked sense (*comprehendi sensu spoliato*). They are indeed perceived simply as a result of coloring the ultimate sense after having colored the eyes" (*per hoc enim tantum apprehenditur quia ultimum sentiens iis tingitur*).[7] The writers on *perspectiva* remarked however that "no visible… except light and color is perceived by sense alone".[8] They argued that the cognitive processing required to perceive all non-common sensibles could not in fact be performed by the sense of vision alone, but demanded the intervention of the higher faculties of the soul and, more specifically, "of the discriminative faculty, almost imperceptibly intermingled with reasoning" (*virtute distinctiva et argumentatione, quasi imperceptibiliter immixta*)".[9] Vision taken in isolation from these higher powers of the soul is indeed precisely what Pecham had in mind when he spoke of a "naked sense". According to the writers in the field, the perception of the non-proper sensibles required indeed no less that a *visio per sillogismum*, to be ultimately attributed to the understanding (at least according to Bacon).[10] Bacon's radical "intellectualization" of the process though with the non-proper visibles are perceived was however mitigated by other authors, which credited these cognitive operations to one of the numerous faculties posited by Medieval Aristotelians between sensibility and the understanding, most notably of all to the *virtus distinctiva* or *cogitativa* (Bacon himself, as a matter of fact, qualified his claim, arguing that it applies only to *some* of the non-proper visible).

The influence on Descartes of the Perspectivists' theory of the common sensibles is already clear the *Treatise on Man*, where after having presented his theory of he was later to call the "institution of nature" in order to account for the perception of light and color, he proceed to

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[7] Pecham, *Perspectiva communis* I 58 {61}; Lindberg 139: "*Lucem et colorem comprehendi sensu spoliato*. Per hoc enim tantum apprehenditur quia ultimum sentiens iis tingitur". The expression *sensus spoliatus* comes from the Latin translation of Ibn Al-Haytham's Kitāb al-Manāzir, made towards the end of the 12th Century by the workshop of Gerard of Cremona (possibly by Gerard himself); cf. Alhacen's *De aspectibus* I 7, 6.61; ed. Smith 49, 377 (Sabra renders the original Arabic term as "pure sensation"; ed. Sabra 82). The same Arabic expression is translated throughout the second book as *solus sensus*, which Smith renders as "brute sensation" or "brute sense-perception"; Smith 409. Accordingly, the Latin-speaking Perspectivists speak interchangeably of vision "by naked sense" and "by sense alone".

[8] Pecham, *Perspectiva communis* I 56[a] {59[a]}; Lindberg 137*.

[9] *Ibid.*

[10] I argue at length for this claim in my "*Sensus spoliatus*: Sensation and Cognition in 13th-Century Theories of Vision" in Elena Baltuta ed., *Theories of Sense-Perception in the 13th and 14th Centuries* (forthcoming).

discuss the cognitive operations that " give the soul a way of sensing position, shape, distance, size, and other similar qualities, not qualities related to one particular sense… but ones that are common to touch and vision and even in some way to other senses".[11] As he remarked four years later in the *Dioptrics*, "only light and color properly belong (*appartiennent proprement*) to the sense of sight".[12] In the *Meditations*, Descartes brought Bacon's "intellectualization" of the process though with the non-proper visibles are perceived to its most extreme consequences, and reduced the more nuanced account presented in the works of the 1630s to the claim that the *non-proper* visibles can in fact be described as sensibles only in a quite *improper* sense, the perception thereof being the result of an *intellectual* operation. Descartes' theory of the mind leaves in fact no room for the higher sensory faculties of the mind posited by Aristotelians such as the *virtus æstimativa* and *distinctiva* mentioned above, and refuted the very notion of a "judgment of the senses", to attribute all like cognitive operations to the understanding alone.[13] As Descartes makes explicit in the *Sixth Replies*, the only reason why he had spoken of a "third grade of *sensory* response" was because "such reasoning is *commonly* assigned to the senses", which is yet precisely the claim Descartes was trying to refute. Berkeley's later remarks that "things are suggested and perceived by the senses. We make judgments and inferences by the understanding" is indeed largely the result of Descartes' theory of the perceptual process, notwithstanding Berkeley's strong rejection of most of Descartes' other theses.[14]

Quite a few interpreters have argued that it was precisely by appealing to the cognitive operations carried out in the third stage of the visual process that Descartes intended to justify the applicability of mathematics to nature and thus, ultimately, to ground the claim that material object are *extended* things. More in particular, Nancy Maull put much emphasis on one specific cognitive operation described by Descartes in the works of 1630s: "the natural geometry" of sight, by means of which according to Descartes the perceiver would be able to calculate the distance of the object by a trigonometric reasoning based on the different location of the two eyes, or of the same eye at different times (the idea of a *triangulum distantiæ mensorium* comes from Kepler, thereby confirming once again the key importance of the *Ad Vitellionem*

[11] *Homme*; AT XI 159; Hall 59.

[12] *Dioptrique* VI; AT VI 130; CSM I 167*.

[13] For a history of the concept, see David Summers, *The Judgment of Sense: Reinassance Naturalism and the Rise of Aesthetics* (Cambridge: Cambridge University Press 1987).

[14] Berkeley, *The Theory of Vision… Vindicated and Explained* (1733) § 42; Luce – Jessop I 265. On the relations between Descartes' theory of vision and mind and Berkeley's, see William Epstein – Gary Hatfield, "The Sensory Core and the Medieval Foundations of Early Modern Perceptual Theory", *Isis* 70 (1979): 363-84.

Paralipomena for Descartes' theory of vision).[15] As nicely epitomized by Hatfield, according to Maull's "proto-Kantian" reading, the reason why "we can expect that geometry will be an apt description… of the world es experienced" is simply because ""we are doing geometry in seeing" – i.e. because the features of bodies we are confronted with in our visual experience are the result of a "judgment using an algorithm".[16]

As convincingly shown by Hatfield, in both the *Treatise on Man* and the *Dioptrics* Descartes does however expressly maintain that the perception of visible features such as distance (and, by the same token, size and shape) is not necessarily cognitive in nature. For how much in the *Meditations* Descartes attributes the perception of all sensibles other than the proper ones to the understanding alone, in the writings of the 1630s Descartes argues in fact that, at least in some cases, the perception of distance immediately results from the brain state and, more specifically, from the leaning of the pineal gland caused by a change in the shape of the body of the eye. "Immediately resulting" from the brain state is what according to Descartes characterizes the *second*, non-cognitive stage of the perceptual process and Descartes does indeed speak of "sensing" the location of the object: "sensing", not "judging".[17] Accordingly, Descartes argues that even the perception of distance is (at least in some cases) the mere result of the "institution of nature", on a par with the perception of the proper sensibles:

> We can change [the shape of the body of the eye] in order to adjust the eye to the distance of objects, we also change a certain part of our brain, in a way that is instituted by nature to allow our soul to perceive that distance.[18]

If the previous chapters have considered Descartes' theory of an institution of nature only insofar as the *proper* sensibles were concerned this was indeed only because they were meant to study Descartes' argument that the ideas of the proper sensibles represent these features of

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[15] On Descartes' appropriation of Kepler's *triangulum distantiæ mensorium* see Delphine Bellis, "The Perception of Spatial Depth in Kepler's and Descartes' Optics: A Study of an Epistemological Reversal" in Koen Vermeir – Jonathan Regier eds., *Boundaries, Extents and Circulations: Space and Spatiality in the Early Modern Natural Philosophy* (Dordrecht: Springer 2016), 125-52.

[16] Gary Hatfield, "On Natural Geometry and Seeing Distance Directly in Descartes" in Vincenzo De Risi ed., *Mathematizing Space: The Objects of Geometry from Antiquity to the Early Modern Age* (Berlin: Birkhäuser 2015), 170. In this paper Hatfield also presents an insightful critical survey of the literature on the topic, to which the reader is referred for more details, but to which it should however be added at least Michel Fichant, "La géométrisation du regard: Réflexions sur la *Dioptrique* de Descartes", *Philosophie* 34 (1992): 31-49.

[17] *Homme*, AT XI 183; Hall 94-95.

[18] *Dioptrique* VI; AT VI 137; O 105-6*.

bodies *as other than they are*, from which Descartes concluded that bodies are to be taken to be nothing but extended substances. Once considered in its entirety, Descartes' theory of an institution of nature challenges however any reading along Maull's line: if Descartes' reason to attribute the third stage of the visual process to the understanding and to spell it out in terms of a "natural geometry" was indeed to ground the claim that bodies have geometrical properties (that they are extended substances), it is indeed quite hard to explain why he worked out in the very same pages a non-cognitive account of how features such as distance, size and shape are perceived.

Descartes' two alternative accounts of how the non-proper visibles are apprehended do undeniably conflict, as pointed out by many scholars.[19] Descartes' motivation for advancing both of them at the same time is however one and the same: proving that he could account for the perception of the non-proper visibles without having to appeal to intermediate faculties such as the *virtus distinctiva* and *cogitativa*. Descartes, consequently, carried to their extreme conclusions both strands of Bacon's theory of vision: *visio per sillogismum* became in this way purely intellectual; animal instinct became a bodily mechanism that was taken to trigger color and light sensations according to a psycho-physiological law (what Descartes called "the institution of nature"). Since Bacon – like the vast majority of medieval and early modern philosophers – maintained that the only one rational animal is the human being, he argued in

[19] For a presentation of the tensions in Descartes' account of how the non-proper sensibles are apprehended by sight see, besides the already-quoted papers by Hatfield, Celia Wolf-Devine, *Descartes on Seeing: Epistemology and Visual Perception* (Carbondale, IL: Southern Illinois University Press 1993). Id., "Descartes' Theory of Visual Spatial Perception" in Stephen Gaukroger – John Schuster – John Sutton eds., *Descartes' Natural Philosophy* (London: Routledge 2000), 506-23. The tension cannot be ironed out in terms of *Entwicklungsgeschichte*: the works of the 1630s defend indeed both the cognitive and the non-cognitive account of distance perception. Even after the *Meditations* Descartes seems to have maintained that distance is perceived merely as a result of the "institution of nature". As a matter of fact, the *Treatise on Man* presents *two* accounts of the distance perception by sight (AT XI 158-62 & 182-87), the second of which is even more explicit in developing a non-cognitive account of the visual process for the non-proper sensibles. There are however pieces of evidence that Descartes kept on reworking the treatise well after 1633; see at least the already quoted paper by Rosaleen Love, "Revisions of Descartes' matter theory in *Le Monde*", *British Journal for the History of Science* 8/2 (1975): 127-37, recently corroborated by Peter Machmer – J. E. McGuire, *Descartes' Changing Mind* (Princeton, NJ: Princeton University Press 2009), 15-16. Although the issue remains quite speculative, is possible that the second – and more markedly non-cognitive – account of the visual process was written in the early 1640s, at the time when Descartes was reworking the topics studied in the *Treatise on Man* (and, according to this proposal, also the treatise itself) into the fifth and sixth part of his *Summa philosophiæ*. The second account of the visual process presented in the *Treatise on Man* could accordingly be regarded as the best approximation we have of how the final and never accomplished books of the *Principles* were supposed to look like (I am strongly indebted to Gary Hatfield for these remarks).

fact that in the case of non-human animals the "vision by syllogism" is to be taken just as an analogical way of speaking (*ac si arguerent*; *premissis simulantur*)[20] to describe how the sensitive soul naturally happens to experience the non-proper sensibles as a result of having experienced colors. According to Bacon, distance is indeed *sensed* by animals in the same way that colors are. The only difference between the two is that distance perception does not result from a mere material change in the sense-organs, but from an *ingrained reaction* to this material change (i.e. the organ's becoming-colored). This ingrained reaction is therefore to be understood as an *operation* of the sensitive soul – Bacon calls indeed upon "animal industry" for its performance – but cannot clearly be described as a *cognitive* operation of the same kind as judgment and learning. According to Bacon animal distance-perception is indeed *non-inferential*: in their case, the sensitive soul is so constituted as to *experience* objects at a distance merely as the result of certain color-sensations, a point Bacon expresses by claiming that in animal perception "thinking proceeds as it does by natural instinct alone" (*ex solo instinctu naturali sic decurrit cogitatio eorum*).[21] As a matter of fact, it is even *non-discursive*. In the case of animals, reasoning (*discursus*) from premises to conclusions – in this particular instance, from seeing such and such a set of colors to judging the object to be at a certain distance – amounts in fact to a mere perceiving that the conclusion is the case (in this particular instance, that the object is at a certain distance from the animal in question). For Bacon, this automatic and naturally determined reaction (*instinctu nature sine deliberatione*)[22] giving rise to distance-sensation counts at the same time as "one of the doings of the body" and as "one of the doings of the soul".[23] Once rejected the hylomorphic model in which Bacon operates, Descartes came however to reconceive of this "instinct reaction" in terms of a "psychophysiological mechanism" (the expression is always Hatfield's): merely as a result of a certain brain state, the mind is structured in such a way as to have a certain sensation.[24] It is not a matter of coincidence, therefore, that Descartes was the first thinker to advance a fully-fledged intellectualization of the cognitive stage of the visual process and, at the same

[20] *Perspectiva* II 3, 9; Lindberg 251.

[21] *Perspectiva* II 3, 9; Lindberg 247-49.

[22] *Ibid.*

[23] The expression comes from Myles Burnyeat, "Aquinas on 'spiritual change' in perception" in Dominik Perler ed. *Ancient and Medieval Theories of Intentionality* (Leiden: Brill 2001), 129-53.

[24] Hatfield, "On Natural Geometry and Seeing Distance Directly in Descartes", 168. For a valuable alternative (but to my eyes mistaken) of the "natural geometry" of sight in Descartes, see Thomas C. Vinci, "Reason, Imagination, and Mechanism in Descartes's Theory of Perception", Oxford Studies in Early Modern Philosophy 2 (2005): 1035-73, which elaborates the account sketched by the same author in *Cartesian Truth (New York - Oxford: Oxford University Press 1998).*

time, the first to work out a *non-cognitive* account of distance perception based on a proper "psychophysiological mechanism": both strands of Descartes' account stem in fact directly from the attempt to prove that his theory of the mind could dispense with the sensory soul, inasmuch as all the operations usually ascribed to this latter can be explained by appealing either to the intellect or to the body.

The main difficulty of Maull's interpretation is not, however, that Descartes' cognitive account of how non-proper sensibles are perceived is limited to *some* instances of the visual process. Its major constraint is indeed to be limited to the *visual* process alone: even in the *Meditations*, despite presenting his account of distance and size visual perception in purely cognitive terms, Descartes is indeed crystal-clear that the location of a tactile sensation is not inferred though a reasoning but immediately experienced as a result of the "institution of nature". According to Descartes is not indeed the case that the perceiver first experiences pain and on a later stage "calculate" by means of something like a "natural geometry" of touch where this sensation of pain is to be located.[25] If Descartes' account of the perceptual process is however intended (as argued by Maull) to account for the geometrical properties of bodies, is clear that all senses should work perfectly on a par. The fact that this is not the case confirms that by his theory of a "natural geometry" of vision Descartes did not intend to ground his metaphysics of bodies, but answer a difficulty specific to vision theory, that challenged since ancient time the experts in the field.

The most serious flaw of any interpretation *à la* Maull is however that it fails to provide an adequate foundation to Descartes' theory of bodies. In order to her argument to get off the ground, Maull must indeed assume as *given* both the physiology of the visual system (and, more specifically, the existence of two-dimensional retinal images) and the "natural geometry" of vision, from which in her mind Descartes *infers* that bodies are three-dimensional, since this is how the sense-perceptions resulting from the retinal images are *inferentially structured* by the cognizer.[26] Descartes' claim that bodies are extended substances would accordingly be grounded

[25] *Meditationes* VI; AT VII 87, 5-11 & 88, 7-9; CSM II 60*: "When the nerves are pulled in the foot, they in turn pull on inner parts of the brain to which they are attached, and produce a certain sensation in them. And nature has established that this motion should produce in the mind a sensation of pain as occurring in the foot (*qui institutus est a natura ut mentem afficiat sensu doloris tanquam in pede existentis*)".

[26] As shown in §4, Maull is not the only interpreter to have claimed that according to Descartes sense-experience is structured by the understanding, and some scholars went actually so far as to argue with Maull that such a "structuring" is achieved through inferences. As already argued (always in §4), Descartes' texts do not seem however to support this kind of interpretations, and is in fact possible to make sense of Descartes' account of sense-perception in simpler terms.

on *empirical* considerations and, thus, would ultimately be itself empirical in nature. Schuster, according to whom in his early writings Descartes tried to establish the applicability of mathematics to material objects by considering the physiology of the visual process, has insisted at length on the obvious shortcomings of this line of reasoning, which according to Schuster urged Descartes to adopt a completely different strategy in his mature writings. As suggested in the previous chapters, already in his early works Descartes seems however to rely on purely phenomenological criteria to ground the claim that bodies are extended substances, and only taken advantages of what Schuster calls the "o-p-p nexus" to argue that they are *nothing but* extended. As argued at length in the first part of this work, at least in the *Meditations* and following writings there are however no doubt that Descartes intended to establish on the basis of *prima philosophia* that bodies are *res extensæ*, whereas Maull and other scholars make of it an empirical question: in Maull' cases unwittingly, whereas others such a Larmore came to the point of claiming that Descartes defended an "empirical epistemology" and criticize him on that account.[27] And rightly so, in case Descartes would have ever intended to ground on his physiological researches the claim that the essence of bodies consists in extension. But as argued at length in the first part of this work he simply did not. Contrary to what claimed by Downing, Descartes' theory that bodies are nothing but extended substances does not fall into any vicious circles of this sort (the theory has admittedly its own difficulties, and quite a few as a matter of fact: not this one).[28] Thanks to his first philosophy Descartes maintained indeed to have established that bodies are essentially extended, and to have proven that is not necessary that sensory ideas represent the physical properties they are about as they really are. On the basis on his empirical researches – first of all his account of vision – Descartes believed to have shown that there is in fact no need to posit in material substances any properties other than the geometrical ones first philosophy has already proven to be there, from which he concluded that bodies are indeed nothing but extended substances. It cannot therefore be maintained, as Clarke did, that according to Descartes the thesis that the essence of matter is extension is "functions as a methodological assumption... [which] remains to be confirmed or disconfirmed by its relative success in shaping a successful physics".[29] According to Descartes that bodies are *res extensæ* is indeed what makes physics possible in the first place, i.e. what demonstrated that there

[27] Charles Larmore, "Descartes' empirical epistemology" in Stephen Gaukroger ed., *Descartes: Philosophy, Mathematics and Physics* (Brighton: Barnes and Nobles 1980), 6-22.

[28] Lisa Downing, "Sensibles Qualities and Material Bodies in Descartes and Boyle" in Lawrence Nolan ed., *Primary and Secondary Qualities: The Historical and Ongoing Debate* (Oxford: Oxford University Press 2011), 114.

[29] Desmond M. Clarke, *Descartes' Philosophy of Science* (Pennsylvania State University Press 1982), 95.

are bodies and that these bodies are "the objects of geometry made real" (to use Garber's nice phrasing). The role of physics for Descartes' theory of bodies is to determine whether any entities and properties besides extension and its modes are to be posited in order account for the behavior of material substances, such as the *rubedo* of the Scholastics mentioned so many times in the previous pages. In order to support his reading, Clarke comes to point of omitting the really crucial point of a crucial text. At the end of the *Principles* Descartes claims that thought the treatise ha has "used no principles which are not accepted by anyone": so reads the title of *Principia* IV 200. "Who has ever doubted that bodies move and have various sizes and shapes, and that they various different motions correspond to these differences in size and shape?", he asks his readers.[30] Who can therefore call into question, Descartes wonders, that bodies are indeed extended? In order to support this claim Descartes points out that these features such as shape:

> are not detected by one sense but several – sight, touch, and hearing, and can also be distinctly imagined and grasped by the pure understanding. But the same cannot be said of the other characteristics like color, sound and the rest, each of which is perceived not by several senses, but by one alone: the idea thereof are indeed always confused, and we do not know what they really are.[31]

Clarke, in quoting the passage, omits the reference to the imagination and the pure understanding, to suggest that the ultimate foundation of Descartes' distinction between two classes of the ideas of material substances is provided by the distinction between proper and common sensibles and its thus ultimately empirical in nature (since it remains to be empirically determined what are indeed the sensibles that can be apprehended by more than one sense). But does the theory of the common sensibles play in fact any role in Descartes' mature philosophy? The first part of this work has shown that this is in fact far from being the case, and the argument presented in this chapter should have corroborated this claim even further. The reason why Descartes demotes the ideas of color and like features to the class of "confused" perception is not indeed that they can be perceived by *one sense only*, but because they are perceived *by the senses alone* (how many of them, is beside the point). According to Descartes, whereas shape and like features could indeed be both sensed *and* understood (i.e. apprehended

[30] *Principia* IV 200; AT VIII-A 323, 25-28; CSM I 286.

[31] *Ibid.* AT VIII-A 323, 25 - 324, 5; CSM II 286*: "Hoc non uno tantùm sensu, sed pluribus, visu, tactu, auditu deprehendimus; hoc etiam distinctè imaginamur & intelligimus: quod de reliquis, ut de coloribus, de sonis & cæteris, quæ non ope plurium sensuum, sed singulorum duntaxat percipiuntur, dici non potest: semper enim eorum imagines in cogitatione nostrâ sunt confusæ, nec quidnam illa sint scimus".

by the pure understanding independently of the body), colors and all the remaining proper sensibles of the Aristotelian tradition are indeed confined to sensory apprehension alone. The really crucial point for Descartes is not, accordingly, that shape and like features are *common* sensibles, but the fact they the mind also have innate intellectual notions of these features and can therefore (if embodied) imagine them in a distinct way (as explained in detail in §6).[32] As masterfully pointed out by Simmons, the deep bifurcation in the Cartesian mind is not between the sensing of secondary qualities and the more or less intellectual perceiving of primary qualities, but between sensory perception in general (as encompassing the perceiving of both colors and shapes) and purely intellectual perception.[33] Therefore, whether Descartes defended a non-cognitive or a cognitive account of the visual perception of shape and analogous features (or both of them in the very same works) has no consequences for his claim that the essence of bodies consists in extension, and for the subsequent claim that they are indeed nothing but extended. In order to ground the former, Descartes appealed to the intellectual ideas of these features. To argue for the latter, Descartes thought that the study of the physiology of the perceptual process was relevant only insofar as the features of which the mind lacks an innate understanding are concerned. Descartes' theory of a "natural geometry" of sight, for how much important for the general history of the theories of vision and perception, has indeed no role to play in Descartes' theory of bodies. That bodies are intrinsically extended was for Descartes attested by the "fleshless eye" of the pure mind.[34] That bodies are nothing but extended was proven to be the case by dissecting the optic nerves. Whether the mind needs to perform a calculation in order to gauge distance or bodies are immediately perceived in a certain location as a result of the "institution of nature", albeit a topic worth studying and interesting in its own

[32] Why are these geometrical features also perceived by all (or at least, more than one) sense? Descartes does not provide any answer to this question, which remains therefore open to speculation. Descartes' account of sensory ideas leaves open whether ideas of this sort represent the objects they are about (or not), so that according to Descartes sensory ideas cannot be taken at face value. But although for Descartes it cannot established that bodies are extended on the basis of sensory ideas, since bodies are indeed extended it makes sense that the senses – that *all* the senses, at least in principle - apprehend these features. Alternatively, Descartes could simply be stating a matter of fact. What truly matters, though, is that the distinction between proper and common sensibles has no role whatsoever in Descartes' mature argument that bodies are nothing but extended substances.

[33] Alison Simmons, "Descartes on the Cognitive Structure of Sensory Experience", *Philosophy and Phenomenological Research* 67/3 (2003): 549-79.

[34] The expression comes from Gary Hatfield, "The Senses and the Fleshless Eye: The *Meditations* as Cognitive Exercise" in Amélie Oksenberg Rorty ed., *Essays on Descartes'* Meditations (Berkeley - Los Angeles - London: University of California Press 1986), 45-80.

right, has on the other hand for Descartes without consequences for his grand claims concerning the nature of bodies.

Conclusions: Looking ahead

As shown in this work, all ideas according to Descartes represent, being intentionality the defining feature of these mental representations. All the theoretical faculties of the mind are indeed construed by Descartes as "functions" of the intellect, whose proper object is according to Descartes the object's essence. For Descartes the articulation of the understanding into the faculties of imagining and sensing as a result of embodiment does not affect the aboutness of ideas, but as a matter of fact, grounds it. According to Descartes – it has been shown – *all* ideas do indeed intrinsically represent the essence of the objects they are about. "Representing something", argues Descartes, is however not to be confused (and hence illegitimately equated) with "being similar" thereto: words represent, and yet "as everybody knows, words bear no resemblance to the things they signify".[1] Besides having an *intentional object*, any idea possesses in fact according to Descartes also a *presentational* or *aspectual character*: according to Descartes one should indeed distinguish between *what* the idea is about and *how* this object presents itself to the mind. Descartes argues that the ideas of the understanding represent and present their objects as they really are: the understanding is indeed man's highest faculty, so that man could not appeal to any other power of his mind to enquire into the nature of things. Intellectual ideas, according to Descartes, must therefore provide a crystal-clear insight into the essence of bodies, and apprehend them as they actually are. The same does not however apply to sensibility: although sensory ideas too do in fact represent the objects they are about, in this case for Descartes it cannot in fact be taken for granted that sensory ideas do present their objects exactly *as they are*. Contrary to what happens with the ideas of man's highest cognitive faculty, for Descartes it cannot in fact be determined on purely philosophical grounds whether the presentational character of sensory ideas is to be taken at face value, or not. The differences in presentational character of sensory ideas can for Descartes be proven to represent real differences in the constitution of bodies. Whether material object are however *as* sensory ideas depict them to be (colored, for example, and so on) remains however to be established on different grounds. This is what Descartes meant by saying that sensory ideas "represent the essence of bodies only in a very obscure and confused way".[2] Contrary to the ideas *innate* to the

[1] *Monde* I; AT XI 4, 3-5; CSM I 81*.

[2] *Mediationes* VI; AT VII 83, 16-23; CSM II 57-58*: "sed video me in his aliisque permultis ordinem naturæ pervertere esse assuetum, quia nempe sensuum perceptionibus… utor tanquam regulis certis ad *immediate*

understanding, the adventitious ideas of the sense cannot in fact but be *epistemologically opaque to the intellect, which is therefore in no position to figure out whether objects are truly colored as sensory ideas portray them to be, or have in fact no other properties but the geometrical properties that the it – the understanding – innately knows to be there. Descartes, therefore, concludes that "one misuses* sensory perceptions by treating them as reliable touchstones for immediately discerning the essence of the bodies located outside us".[3] It is indeed only thanks to his natural philosophy and, more specifically, to his researches on the psychology and physiology of the perceptual process (starting from the visual one), that Descartes thought that it could be established that bodies are in fact nothing but extended substances, with no other properties but being of a certain size, with a certain shape, in motion or at rest in relations to one another. Or, to put it in different terms, that "the nature of bodies" coincides with the *puræ Matheseos objectum* – "the subject-matter of pure mathematics".[4] The consequences of this theory of bodies for Early Modern metaphysics, epistemology and science are far-reaching, the opposition it encountered fierce, the new philosophical views it prompted among the most significant of the time: in order to trace its legacy, even only in broad strokes, one would have to provide a general assessment of Early Modern thought.

If this would exceed by far the scope of this work, there is however one aspect of Descartes' argument that bodies are nothing but extended substances that deserves to be highlighted before concluding it. A point that does not have so much to do with Descartes' theory on the nature of bodies, but pertains to the theory of perception as such and is arguably among the most innovative of his philosophy. If throughout this work it has been put a lot of emphasis on the shortcomings of sensory ideas – especially if confronted with intellectual one – it is indeed to be pointed out that for Descartes this is far from being the entire story. Sensory ideas, according to Descartes, represent indeed the objects they are about *as other than they are*: as colored, for example, when they are in fact not. A question arises, though: why do sensory ideas represent them in this way rather than in any other? Is the presentational character of sensory ideas completely arbitrary, or is there a *reason* behind the specific institution of man's nature? It is indeed precisely by means of the concept of an "institution of nature" that Descartes intended to account for the content of sensory experience. This institution seems however to be completely arbitrary. If "to represent", in the case of sensory ideas, only means in fact that

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dignoscendum quænam sit corporum extra nos positorum essentia, de qua tamen nihil valde obscure & confuse significant" (emphasis added).

[3] *Ibid.*

[4] *Ibid.* AT VII 71, 14-16; CSM II 50*. *Meditationes* V; AT VII 71, 8-9; CSM II 49.

the differences among (say) color-perceptions are isomorph to the differences in the textures of bodies, then *any* institution would do the job, as the already presented reworking of the *Rules* diagram should have already made clea

And, as far as nothing but the issue of representation is concerned, this is indeed the case. According to Descartes, there is however something truly specific in sense-perception, that puts constraints on the correspondence between brain and mental states and, accordingly, on the completely arbitrary character of the "institution of nature". If sense-perceptions cannot be taken to provide *as such* any insight into the essence of bodies, for Descartes there is however a sense in which they are "clear and distinct enough". "Sense-perceptions", he claims, "were indeed properly given me by nature simply to signal the mind what is beneficial or harmful to the composite of which it is a part".[5]

Descartes illustrates this thesis by considering the sense-perception of pain. As he intended to show thanks to his physiology, pain-sensations are indeed caused by a laceration of the extremities of the nerves innervating a limb. Human beings, however, do not experience such a laceration of the nerves' fibers, but have a "very clear perception of pain", which is yet similar under no regard to what this idea does in fact represent.[6] Pain-perceptions, according to Descartes (like all sense-perceptions), do nonetheless represent, as confirmed by a letter to Regius written between the first and the second edition of the *Meditations*, where Descartes speculates that

> we perceive that sensations such as pain (*sensus doloris*) are not pure thoughts of a mind distinct from a body, but confused perceptions of a mind really united to a body. If an angel were in a human body, he would not have the sensations as we do, but would simply perceive the motions which are caused by external objects, and in this way would differ from a real man.[7]

Both the angel's and man's sensory idea of pain are indeed according to Descartes ideas of the same thing, but in this case the presentational character of the two different even more markedly than it was for the two ideas of the sun already discussed in §0. If sense-perceptions happen to present the objects they are about as so different than they are, for Descartes this

[5] *Mediationes* VI; AT VII 83, 16-23; CSM II 57-58. On Descartes' reappraisal of sensibility, see Dominik Perler, "'Se détacher des sens': Sur la fonction des sensations dans l'épistémologie cartésienne", *Studia Philosophica* 55 (1996): 9-30.

[6] From the already quoted *Principia I 46; AT VIII-1 22, 10-17; CSM I 208*.*

[7] To Regius, January 1642; AT III 493; K 206. This passage by itself suffices to dispel the charge of "angelism" levelled against Descartes by Jacques Maritain, *Le songe de Descartes, Suivi de quelques essais* (Paris: Corrêa 1932).

does not however depend of the mind's embodiment taken in general, but from what he calls the specific "institution of *human* nature", governing the relation between the brain and the mental states of a human being. Descartes claims that there could even be good reasons why we do in fact perceive a laceration of the nerves' fibers as the most hideous all of sensations. If according to Descartes the presentational content of sensory ideas can in fact no longer be taken as a leading thread to any enquiry into the constitution of body (were only the ideas of the understanding has been proven to be reliable), this same content plays however a crucial role in the life of the embodied mind. Although they represent the essence of their objects "only in a very obscure and confused way", for Descartes sense-perceptions are "clear and distinct enough" representations of "what is beneficial or harmful to the composite of which the mind is a part" – namely, of the mind-body union.[8] Such a clarity, Descartes insists, has however no role to play in a theoretical enterprise and, accordingly, is of no help for the foundation of physics. Sensory ideas are indeed to be regarded according to Descartes first and foremost as generally reliable *environmental clues* for the survival of the (ensouled) animal, so that only by proceeding with extreme caution can therefore a scientist make good use in his or her researches of what are first and foremost *ecological guides for action*, sensory ideas being "clear and distinct enough" for these purposes, insofar as they enable the human animal to react befittingly in a clear majority of cases.

Descartes' account is fascinating, and paves the way to the much later concept of a *Lebenswelt*, according to which (at least) some classes of our mental representations should not be understood as second-rate sources of knowledge but as the fundamental elements based on which living beings orientate themselves in the world. Sense-perceptions, accordingly, would be more relevant for *practical* than for *theoretical* problems, and it would be precisely against such a misuse of these class of ideas that Descartes would be warning Aristotelians. While arguing that "God could have made the nature of man such that this particular motion in the brain indicated something else to the mind" – a different sensation, namely – Descartes claimed that God resolved himself for this specific institution of nature because this one is "the most conductive to the continued well-being of the body".[9] In the passage quoted above Descartes is equally

[8] *Mediationes* VI; AT VII 83, 16-23; CSM II 57-58*: "sensuum perceptionibus, quæ proprie tantùm a naturâ datæ sunt ad menti significandum quænam composito, cujus pars est, commoda sint vel incommoda, & eatenus sunt satis claræ & distinctæ, utor tanquam regulis certis ad immediate dignoscendum quænam sit corporum extra nos positorum essentia, de quâ tamen nihil nisi valde obscure & confuse significant". On Descartes' "ecological" account of sense-perception, see the conclusion to this work (*Looking ahead*).

[9] *Ibid.* AT VII 88, 12-14; CSM II 61: "nihil aliud ad corporis conservationem æque conduxisse".

explicit about the teleological role of sense-perception in helping the perceiver to stay alive, arguing that sense-perceptions had been "given us by nature" (and, thus, ultimately by God) for this specific purpose.

It is however questionable that Descartes could in fact justify this claim. Throughout all his writings Descartes has indeed repeatedly insisted that final causes must be forbidden from any enquiry, since final causes are ultimately grounded on God's will. But God's will is completely free, so that for Descartes one cannot deduce God's intention in creating things and in creating them the way he did. Descartes' deduction of the laws of physics was not indeed based on finalistic principles, but only on the claim that given the fact that God is the supremely perfect being and being immutable is a perfection, God's will and his way of acting upon the material world he has (we do not know why) created will not change over time. It is indeed with a reasoning along the same lines that Descartes validated the "natural light" and more generally, the reliability of the cognitive powers of all finite intelligences. Since God cannot be deceptive – since he would otherwise be imperfect – the cognitive set-up of the beings he created must be such that, in case a cognizer cannot but take something to be true, must indeed be true. As Descartes argued, "there cannot in fact be another faculty I can equally trust as this natural light, and which could teach me that what is revealed to me by this natural light is not true".[10]

In the case of sense-perception, on the other hand, Descartes seems to smuggle into his account an unwarranted (to his own standards) reference to final causes. Besides conflicting with Descartes' statement against explanation grounded on final causes, Descartes' account of sense-perception does not moreover dovetail too nicely with his theory of the mind-body union. Sense-perception, according to Descartes, results in fact from the embodiment of the mind. But why (one might ask), does the mind get embodied in the very first place? This question too, according to Descartes, transcends the reach of our understanding. But if this is the case, then it cannot also be explained why a pure mind should ever care about the body to which is inexplicably and unnecessarily conjoined. For a living being the most dreadful scenario is indeed his death, which for Descartes amounts yet to nothing but a modification in the shape of some piece of matter, as a result of which the body is no longer conductive to the mind-body union. But why should this be any problem for a thinking substance which can subsist without any body? That God, among all possible "institutions" of the mind's nature, has in fact chosen the one "most conductive to the continued well-being of the body" remains indeed as inexplicable as his initial decision to unite the mind with this one body. In Descartes' system, both claims seem to be doomed to remain *brute facts*. If it cannot be explained why mind and body form "a

[10] *Meditationes* III; AT VII 38, 23 - 39, 1; CSM II 26-27* (emphasis added).

sort of union", then *a fortiori* it cannot indeed be explained why they constitute "a sort of union" of this sort.

In recent years two main strategies have been suggested to make sense of Descartes' claim: Simmons's, and De Rosa's. On the one hand, Simmons qualifies Descartes' rejection of final causes.[11] On the other, she puts much emphasis on the *Sixth Meditation* claim that the senses "report the truth more often than falsehood".[12] Elaborating on this point, and expounding on Gueroult's remarks, Simmons come to speak of a two-fold conception of "truth" in Descartes. The gist of Simmons' reading is that although for Descartes bodies as such are neither red nor blue, they are however objectively dangerous or beneficial to the mind-body union. Sensory ideas, Simmons concludes, would represent precisely these ecological properties, which although relational (being defined in relation to both the physical features of object and the mind) are nonetheless still grounded *in re*.[13] As pointed out by De Rosa, the ontological status of these ecological properties is however quite dubious, and Descartes' texts are far from committing the interpreter to this reading. Descartes' express statements – duly reported by Simmons – that sensory ideas do represent (albeit confusedly) the essence of bodies puts in fact Simmons' reading in a jeopardy, and she cannot properly explain how an idea can represent *two* properties (one relational, the other intrinsic) at one time, despite suggesting at one point that sensory ideas could refer directly to the former, and to the latter only indirectly. A unified account of intellectual, imaginative and sensory ideas as the one defended by Descartes in light of his theory of the faculties demands nonetheless that all these ideas represent one and the same object, for how much their presentational character might differ. De Rosa has especially (and, to my eyes, convincingly) insisted on this point. With the intention to make clear that the intentional object of sensory ideas is for Descartes always the object, De Rosa went however so far as to claim that according to Descartes the perceiver only "uses" sensory ideas to get around in the world.[14] De Rosa unfortunately does not spell out her reading, but any talk of sense-perception being "used" in a certain way would seem to suggest that they could in fact not be used, and therefore be used otherwise, as well as that the perceiver has to perform some sort of

[11] Alison Simmons, "Sensible Ends: Latent Teleology in Descartes' Account of Sensation", *Journal of the History of Philosophy* 39 (2001): 49-75.

[12] *Meditationes* VI; AT VII 89, 12-13; CSM II 61.

[13] Alison Simmons, "Are Cartesian Sensations Representational?", *Noûs* 33 (1999), 363. Although these properties can be qualified as "objective", it still remains to be explained *how* sensory-ideas represent these properties and *why* they represent these properties rather than any other.

[14] Raffaella De Rosa, *Descartes and the Puzzle of Sensory Representation* (Oxford: Oxford University Press 2010), 114-16.

cognitive operations in order to use his perceptions as indications above how to behave if he is to survive. In so doing, De Rosa comes however close to Yolton's reading of the institution of nature in cognitive terms, according to which sensations would be "natural signs" of their effect (a reading rightly contested elsewhere by De Rosa).[15] As shown at length in the previous chapter, Descartes is however crystal-clear that sense-perception (at least as far as all proper sensibles are concerned) is non-cognitive in nature, i.e. requires no intellectual processing. As insisted by Simmons, according to Descartes the living being does indeed immediately behave in a certain way as a result of having certain sense-perceptions, some of which – the passions, construed by Descartes (at least in the writings till 1641) as internal sense-perceptions – immediately prompt a certain course of action and a certain inclination in the will, besides presenting the perceiver with a certain idea.

The above-mentioned distinction between the intentional object of an idea and its presentational character might indeed help to reconcile these two readings. With De Rosa, it is indeed to be insisted that sensory ideas too represent intrinsic features of material substances. With Simmons, on the other hand, it is to be insisted that the perceiver is *immediately confronted* with beneficial and harmful objects, because of the mere institution of his nature (as opposed to the cognitive operations he might or might not perform, or perform otherwise). If for Descartes the intentional object if sensory ideas remain in fact the object's essence, the way they present this object to the perceiver is not in fact neutral. For Avicenna onwards, besides proper and common sensibles most philosophers admitted in fact a third class of sensible features: the so-called *intentiones*. It is by perceiving these *intentiones*, it was argued, that non-rational animals too apprehend a mate as beneficial and a predator an inimical. Descartes, on the one hand, rejected the sensory soul that Aristotelians attributed to animal and to which they ascribed the apprehension of these sensible features of objects: in his views, all non-human animals' operations could in fact be accounted for in purely mechanical terms. This side of the story is well-known among scholars. At the same time, though, through his theory of an institution of nature Descartes wanted to make space in his theory of perception for something more than the mere perception of colors. The *Passions of the Soul* might indeed be regarded as Descartes' last treatise on perception, where he intended to show that his theory could account for *all* the sensible features described by Aristotelians (amicability and dangerousness included) as he took himself to have already done as far as the proper and the common sensibles were concerned. Addressing this issue would call for another book, and is definitely no part of a study on Descartes' argument that bodies are nothing but extended substances. It is however crucial to

[15] De Rosa, *Descartes and the Puzzle of Sensory Representation,* 79 n. 25.

notice that if Descartes downplayed the theoretical role of sense-perception, he did not however intend to claim that sensibility is intrinsically misleading. Descartes' point was rather that taking sensory ideas to provide reliable information on the properties of corporeal substances was (as he calls it) a "subversion of the natural order", since living beings have been given this faculty only to help themselves in their living and their welfare.

One it thus brought back from the difficulty mentioned above: how could Descartes invoke a teleological explanation along these lines after having banned final causes from his philosophy? There are admittedly tensions in Descartes' account, and it can well be that his account of the sensory faculty is just inconsistent. But it seems that Descartes could indeed make a case for the claim he was making, by appealing once again to his theory of the faculties. Descartes, as already remarked, took indeed himself to have established that the overall cognitive set-up of any mind (and hence of an embodied mind too) is sound and truth-directed. From this thesis he inferred that in any given domain the best resource the mind had was to be trusted. Not only the highest faculty of the mind, the "natural light". In case there were no other resources to decide of the truth of an issue, even the "great propensity to believe" in the existence of external objects coming from adventitious ideas was indeed to be trusted, according to Descartes, since in this case like a propensity was the best we had concerning a subject we would otherwise be completely in the dark about. On the other hand, this is not the case for the "propensity" to believe that bodies are indeed similar to the adventitious ideas of the senses we have: in order to determine the essence of bodies Descartes insisted that the mind had indeed to start from the best source of knowledge it has – namely, from its inborn, intellectual notions. To get around in the world, however, the embodied mind has no other place to start by sense-perceptions, since only these adventitious ideas inform it about what confronts it at present. Descartes insisted that the reliability of sense-perceptions is limited, since this faculty (contrary to the understanding) is implemented in a body, which has all the shortcoming proper to material objects.[16] He insisted, moreover, that one ought always to evaluate carefully whether these sense-perceptions and the behavior they promote is to be trusted or not, thereby calling upon an intellectual activity even as far as survival was concerned. Descartes, though, was also keenly aware that the living being simply lacks the time to ponder any sense-perceptions, and that if he is to stay alive – and be happy – in many cases he need to react right away to the surrounding environment. In Descartes' philosophy it remains unexplained why some minds are united to bodies. This union, non-deducible and non-necessary, is for Descartes something we *happen to live* but cannot *fathom*, something unintelligible and yet real, which escapes our "philosophizing"

[16] The issue had already been discussed in §20, to which the reader is referred for more details.

and "meditation" but that our daily living and practice with other human beings attest with uttermost certainty. It remains unexplained, accordingly, why the mind should want to remain in this union with the body: it is indeed probably on this topic that the well-known and apparently irreconcilable tensions between Descartes' dualism and his theory of the mind-body union come to the fore more vividly. Once it is *assumed* that the living being wants to live, that the embodied mind wants to remain embodied for how long as it can, then the "function of the mind" directed to the body to which it is attached (sensibility, namely) and that informs the living being about the conditions of the environment stand out as its best guide for orienting itself in the world. Not for doing science, but for living.

According to Aristotelians sense-perceptions provided a direct insight into the nature of bodies, informing the perceiver about the mixture of the elements which constituted them. Aristotle's philosophy – the reason why we perceive bodies as red, or hot, is that bodies *truly are* red and hot. "Hotness" and "redness" (*rubedo*) counted indeed for Aristotelians among the real properties of bodies. Therefore, in case one sentient was to perceive an object as red and a different sentient being (either of the same or of another species) as deep-blue, according to Aristotelians this could only be explained as an instance of misperception. The sensory experience of *all* sentient beings (rational and non-rational alike) is for Aristotle and his followers one and the same: in their views, a man and his dog do see the world with the same eyes. Perception (they claimed) consists precisely in the perceiver's *assimilating* the object's properties, so that (in case anything goes wrong) *all* perceivers must in fact have the very same sense-perceptions, since the objects they are confronted with are in fact the same.

For Descartes, to the contrary, since bodies were nothing but extended substances there was no argument to suppose that living beings belonging to different species must perceive bodies in the very same way. The "institution of their nature" could indeed be different, since none of them was more "true" than any other. But if theoretical truth was no longer at stake, the survival of these different beings was, and because of their bodily differences it could indeed well be the case that what was beneficial to one being was deleterious to another. If the "institution of nature" is to help the embodied mind to take care of the body to which is united, and these bodies are different, it follows that these "institutions" could and maybe even should in fact be different. It is indeed crucial to notice that in the *Sixth Meditations* Descartes discusses – and refutes – the thesis that God could have "established the nature of *man*" according to any better "institution".[17] Not the nature of a "thinking thing" in general, nor the nature of an *embodied res cogitans* whatsoever, but *human* nature specifically. The very shift in titles of the *Meditations*

[17] *Meditationes* VI; AT VII 88, 7-9; CSM II 60*.

concerning whether the soul enquired in the treatise is the soul in general or the "human" one specifically, suggests that Descartes thought he was not only providing a theory of the mind in general, but also of the peculiarities of our own, *human* soul.[18] According to Descartes, what makes of a human being a *human* being is not his rationality, this being one and the same for *all* "thinking things", humans and non-humans alike. Nor is it the mere fact of having sensations: all *embodied* minds are indeed on a par under this regard. All rational beings, in Descartes' mind, should agree that the philosophy presented in the *Meditations* is true (well, this was a wishful-thinking). And all sentient beings endowed with eyes, if confronted with Descartes' portrait must see it with *some* colors. Which colors exactly depends on the specific "institution" of their nature. It can well be the case, however, that only *we* human beings experience a certain class of bodies as especially relevant to our living, as it can well be the case that only we human beings perceive Frans Hals's painting as it was meant to be perceived. And it is in moments like these that one realizes anew how beautiful it is to be a human being. If sense-experience was for Descartes no longer yielding an insight into the essence of material objects, sensing was yet constantly confronting everybody of us with the constitution of his own nature. By opening our eyes, according to Descartes, we are not only perceiving colors and shapes. Opening our eyes, we are confronted at any time with what it is to be a man.

[18] The subtitle of the 1641 Paris edition is in fact: *in qua Dei existentia, & animæ immortalitas demonstrantur*, whereas the 1642 Amsterdam one reads *Renati Des-Cartes Meditationes de Prima Philosophia, In quibus Dei existentia, & animæ humanæ à corpore distinctio, demonstrantur*. In the 1642 edition too, though, the qualification that the soul at stake is the *human* one is missing as the title of the work is stated once again after the *Synopsis* of the work (AT VII 17). This qualification is nonetheless reintroduced by Descartes in the *Principles*, whose first book is entitled *De principiis cognitionis humanæ*.

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Summary

The work argues that Descartes established his metaphysics of bodies by means of a two-step argument: the former (ultimately grounded on the theory of ideas) being intended to prove that bodies are *extended substances*; the latter (which takes advantage of Descartes' entire natural philosophy) aimed at proving that bodies are *nothing but* extended substances. It shows that for Descartes there are no arguments from 'first philosophy' that could prove that bodies are nothing but extended substances. The work shows that Descartes' argument to eliminate all "real qualities" and "substantial forms" of the Scholastics is ultimately an argument to the best explanation driven by ontological parsimony. In other words, a razor. More in particular, it was the theory of vision to provide the paradigm case for Descartes' ontology of material substances. The work concluded that, contrary to what claimed by virtually all Cartesian scholars, the thesis that bodies are nothing but extended things is not therefore the starting point of Descartes' physics, but its crowning achievement.

Zusammenfassung

Das Buch argumentiert, dass Descartes seine Metaphysik von Körpern durch ein zweistufiges Argument begründet hat: Ersteres (letztendlich auf der Theorie der Ideen beruhend) soll beweisen, dass Körper *erweiterte Substanzen* sind; Letzteres (das die gesamte Naturphilosophie von Descartes nutzt) sollte beweisen, dass Körper *nichts anderes als* erweiterte Substanzen sind. Das Buch zeigt, dass es für Descartes keine Argumente aus der „ersten Philosophie" gibt, die beweisen könnten, dass Körper nichts als erweiterte Substanzen sind. Es zeigt, dass Descartes' Argument, alle „realen Qualitäten" und „wesentlichen Formen" der Scholastiker zu eliminieren, letztendlich ein Argument für die beste Erklärung ist, die auf ontologischer Sparsamkeit beruht. Mit anderen Worten, ein Rasiermesser. Insbesondere war es die Visionstheorie, den Paradigmenfall für Descartes' Ontologie materieller Substanzen zu liefern. Die Arbeit kam zu dem Schluss, dass – entgegen der Behauptung praktisch aller kartesischen Gelehrten – die These, dass Körper nichts als erweiterte Dinge sind, nicht der Ausgangspunkt von Descartes' Physik ist, sondern ihre Krönung.

Erklärung über die selbstständige Abfassung meiner Dissertation

Hiermit erkläre ich, Mattia Mantovani (Matrikel-Nr: 555343), dass ich die vorliegende Dissertation selbstständig und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe.

Die aus fremden Quellen direkt oder indirekt übernommenen Gedanken sind als solche kenntlich gemacht.

Die Dissertation wurde bisher in gleicher oder ähnlicher Form keiner anderen Prüfungsbehörde vorgelegt oder veröffentlicht.

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